Frontier Hard Chrome
Event 8 Long-Term Monitoring Report
(September 2006 Results)

Department of Ecology Contract: C0500198

November 2006

Weston Solutions, Inc. · 190 Queen Anne Avenue North · Seattle, WA 98109-4926

FRONTIER HARD CHROME
LONG-TERM MONTORING REPORT
EVENT 8—SEPTEMBER 2006
VANCOUVER, WASHINGTON

Prepared for

Washington State Department of Ecology
PO Box 47600
Olympia, Washington 98504

Contract No. C0500198

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SECTION 1

INTRODUCTION AND BACKGROUND

1.1 INTRODUCTION

This Long Term Monitoring Report has been prepared under Contract C0500198 to the State of Washington Department of Ecology (Ecology) for Long Term Monitoring of the Frontier Hard Chrome (FHC) site located in Vancouver Washington.

This report describes the sampling activities performed and analytical results obtained during "Event 8" of the long-term groundwater monitoring program at FHC. Sampling activities for Event 8 were conducted during September 2006.

The FHC site was the subject of a remedial action conducted during the summer of 2003. The purpose of the remedial action (RA) was to treat the site's chromium-contaminated soil and groundwater to cleanup levels specified in the Record of Decision. Long term monitoring is required to track offsite plume concentrations as well as show that the remedy is maintaining its operational functionality.

The first 3 groundwater monitoring events (Events 1 through 3) were conducted for the United States Environmental Protection Agency (EPA). In October 2004, responsibility for this site was turned over to Ecology. Ecology contracted Weston Solutions, Inc. (Weston) to perform the next 2 rounds of monitoring (Events 4 and 5) as a result of Weston's familiarity with this site and the associated property owners. Ecology amended Weston's contract in February 2006 to perform 6 additional rounds of quarterly monitoring with the last to be completed in June 2007.

All Event 8 work was performed in accordance with project work plan titled *Frontier Hard Chrome, Long Term Monitoring Plan* (Weston 2004). Minor deviations from the work plan occurred due to unseasonably low water levels; see discussion in Section 2.1.

1.2 BACKGROUND AND PROBLEM DEFINITION

1.2.1 Site Background

The FHC site is located in southeastern Vancouver, Washington (Figure 1). The facility address is 113 "Y" Street, Vancouver, Washington. The site is located in the Section 25, Township 2 north, Range 1 east, Willamette Meridian in Clark County, Washington. The location in latitude and longitude coordinates is 45 degrees, 37 minutes, 19 seconds north by 122 degrees, 38 minutes 45 seconds east (Degrees, Minutes, Seconds [DMS]). The site was previously occupied by several metals fabricating businesses and was used for storage and as a staging area for a neighboring business. Currently, no buildings exist on the site and the site is vacant. A truck driving school is operating on the parcel south of the site.

The FHC site proper covers approximately 0.5 acres and is bordered to the east by Grand Avenue, to the south by Test-U, and to the west by "Y" Street.

Work began on the remedial design in October 2001. The remedial design was completed in February 2003. The remedial action, consisting of building demolition, treatment of source area soil and groundwater, and installation of an in-situ redox manipulation (ISRM) treatment wall (to treat hexavalent chromium), was completed in September 2003.

1.2.2 Problem Definition

The goal of the remedial action was to treat source area soil and groundwater to reduce hexavalent chromium concentrations such that groundwater downgradient of the site would attenuate to chromium concentrations less than 50 micrograms per liter (ug/L). To demonstrate this, groundwater quality was monitored in two areas. The first area consisted of locations immediately within and down gradient of the ISRM wall. Wells located within and just down gradient of the wall were monitored to ensure the continued operational functionality of the ISRM Treatment Wall. The second area monitored consisted of the historical chromium contaminated groundwater plume located down gradient of the ISRM wall. This down gradient plume did not receive treatment during the remedial action and was monitored to track the long-term expected reduction in chromium concentration as a result of completing the remedial action and elimination of the source of hexavalent chromium.

Long-term groundwater monitoring is required by the site's Record of Decision.

1.3 MONITORING SCHEDULE

Sampling events performed for EPA were conducted approximately quarterly for the first year after completion of the remedial action. Planned sampling events were completed in February, April, and August 2004. The sampling event performed the week of 16 August 2004 concluded monitoring for approximately one year after the remedial action was completed.

In September/October 2004, monitoring of the FHC site was turned over to the Washington State Department of Ecology. Sampling of the site groundwater for Ecology occurred in May 2005 and again in December 2005. In February 2006, Ecology amended Weston's contract to perform 6 additional rounds of monitoring to be done quarterly: March 2006, June 2006, September 2006, December 2006, March 2007 and June 2007.

SECTION 2

SAMPLING ACTIVITIES AND RESULTS

2.1 MONITORING WELL SAMPLING PROCEDURES

Sampling activities for Event 8 were conducted on September 25th through September 29th, 2006 by Weston Solutions, Inc, (Weston).

The monitoring wells in the vicinity of the FHC site are shown on Figure 2. A total of 33 wells in the vicinity of the site were sampled for metals in accordance with the *Long Term Monitoring Plan* (Weston 2004). Wells W85-6A and W85-6B (which had previously been damaged and were rebuilt in May 2006) had their casing elevation resurveyed 2 weeks prior to this sampling event.

Well purging and sampling were performed according to sampling guidelines and Weston standard operating procedures. The wells were sampled with a peristaltic pump equipped with new polyethylene tubing deployed to mid-screen depth at each well. The wells were purged prior to sampling until monitored field parameters (turbidity, conductivity, pH, dissolved oxygen, ORP, and temperature) stabilized. The field parameter readings were recorded on field sampling forms.

The summer of 2006 was very dry. As a result, several of the wells had very low water elevations and contained only a few feet of water making sampling difficult. This was the case with Wells W99-R5A, W99-R5B, and RA-MW-12A. The water level in wells W99-R5A and W99-R5B was approximately 28 feet below ground surface; this depth approaches the operating limitation of the peristaltic pump. For these two wells, purge rates were very low and the samples were taken after approximately 45 minutes of pumping each well. Stabilization of the field parameters could not be achieved due to the extremely low purge rates. In the case of Well RA-MW-12A, the well was pumped dry before parameters stabilized. At this well, approximately 10 minutes was allowed to pass and the sample was collected after water slowly infiltrated back into the well. Water levels were low in the remaining wells also, but sampling was completed with little difficulty.

Groundwater samples were analyzed for total analyte list (TAL) metals. In cases where groundwater turbidity was greater than 10 nephalometric turbidity units, samples were passed through a 0.45-micron filter in the field and submitted for dissolved TAL metals. Three wells (RA-MW-12A, B87-8, W85-6B) had turbidity in excess of 10 NTU. During Event 8, both total and dissolved metals analyses were performed on samples collected from RA-MW-15B and RA-MW-16B at Ecology's request.

Selected samples were analyzed for total sulfur and sulfate to provide an assessment of the distribution of byproducts from the reducing agent used during ISRM wall installation.

Groundwater chromium concentrations are provided in Table 1. Measured field parameters are provided in Table 2.

2.2 ANALYTICAL RESULTS

2.2.1 Chromium

Chromium was detected in 31 of the 33 wells sampled. Total chromium concentrations in the "A" zone ranged from a maximum concentration of 5,260 ug/L in well RA-MW-12A to 0.5 ug/L in well W97-18A. All "A" zone wells except RA-MW-12A and B87-8 had total chromium concentrations less than 10 ug/L. Monitoring well RA-MW-12A (which has generally had the highest concentration of chromium) had a dissolved chromium concentration of 6 ug/L. Filtered samples (in addition to unfiltered samples) have been routinely collected from well RA-MW-12A due to its high turbidity.

During this round of sampling, well RA-MW-12A was pumped dry before groundwater parameters had stabilized. This was believed due to the very dry summer and low water table. As a result, a groundwater sample had to be collected immediately after the well recharged. This resulted in the groundwater sample collected for total chromium analyses containing significant particulate matter. However, the filtered groundwater sample cleaned up nicely with a low turbidity.

"A" zone chromium concentrations and plume contours are shown in Figure 3. Filtered sample data was used in preparing Figure 3 where available.

Total chromium concentrations in "B" zone groundwater ranged from a maximum of 45 ug/L (well RA-MW-16B) downgradient of the site to non-detectable concentrations in 2 other locations. With the exception of wells RA-MW-15B and RA-MW-16B, all other "B" zone wells contained total chromium less than 10 ug/L. The filtered samples from wells RA-MW-15B and RA-MW-16B had chromium concentrations of 2.8 ug/L and 1.3 ug/L, respectively.

"B" zone chromium concentrations and plume contours are shown in Figure 4. Filtered sample data was used in preparing Figure 4 where available.

Figures showing the chromium concentration trends in groundwater over time are included in Appendix A. Data from wells sampled during Operational and Functional monitoring in November and December 2003 are included in these figures where available to assist in determining trends. Laboratory chromium data sheets for the September 2006 sampling event are provided in Appendix B.

Figures 3, 4, and those in Appendix A used filtered chromium values where available. In this latest September 2006 round of sampling, turbidity exceeded 10 NTU in three wells; RA-MW-12A, B87-8, and W85-6B. However, filtered samples were also collected from well RA-MW-15B, and RA-MW-16B. Filtered samples were collected from wells RA-MW-15B and RA-MW-

16B at the request of Ecology to assist in determining the cause of the elevated total chromium concentrations in previous sampling events.

2.2.2 Water Quality

Dissolved oxygen (DO) concentrations ranged from a low of 0.27 mg/L to a high of 12.2 mg/L (DO values of 22 and 17 mg/L were neglected since they are above saturation levels; the presence of reagents interferes with correct readings of the DO meter). DO averaged 2.94 mg/L in samples collected within the ISRM Treatment Wall. The average concentrations of DO in this latest round of sampling is slightly higher than the previous round of sampling; this is primarily due a high DO value of 12.16 mg/L in Well RA-MW-12B. The DO concentrations indicate the wall is still reductive which is necessary for treatment of hexavalent chromium. Samples of groundwater collected downgradient of the ISRM Treatment Wall had higher concentrations of DO which tended to increase with distance from the wall.

pH ranged from 4.8 to 8.5. The highest pH during this round was located in well RA-MW-12A; this pH is typical for this well since it contains high concentrations of reagents.

The highest sulfur and sulfate concentrations were located within the treatment wall. Maximum sulfur and sulfate concentrations in groundwater were 402 mg/L and 1170 mg/L, respectively. Concentrations of sulfur and sulfate were significantly lower immediately downgradient of the wall.

2.3 GROUNDWATER FLOW DIRECTION AND ELEVATION

Groundwater surface elevations were determined using the known elevation of the top of each well casing and the depth to groundwater measured in each long term monitoring well. The depth to groundwater measurements were collected during the morning of 28 September 2006. The Columbia River elevation at the United State Geological Survey (USGS) gauging station 14144700 located at the nearby I-5 bridge was obtained for use in determining flow direction. The elevation of the river at 1000 hours on 28 September 2006 was 4.07 feet (corrected to NGVD 1929 by adding 1.82 feet to the measured river elevation). The river elevation information can be obtained from http://waterdata.usgs.gov/wa/nwis/.

Groundwater surface elevations for each well measured are shown in Table 4. The groundwater flow direction (as determined using groundwater surface elevations measured in each well within a period of 2.0 hours) is heading away from the FHC site. A horizontal gradient was calculated for 28 September 2006 with a result of 0.00003 ft/ft with a flow direction toward the Columbia River. The groundwater table during this period had a drop in elevation of 0.07 feet over a distance of 2,400 feet.

Groundwater elevation and gradient information is graphically shown in Figure 5.

2.4 QUALITY ASSURANCE

Data quality was checked by running field duplicates. Laboratory duplicates and matrix spike analyses were performed by the lab. Table 5 shows the quality control results.

Field duplicates were run on both filtered and unfiltered samples during this sampling event. Filtered duplicate results had good correlation with original sample results (relative percent difference of 6.5%). The duplicate of the unfiltered sample had moderate correlation to the original sample with a relative percent difference of 52%. This high difference is attributed to the very high concentrations of chromium in the sample. It is believed that the high concentrations of chromium are associated with the black particulate; its likely that the two field samples may have contained varying quantities of the particulate matter.

2.5 INVESTIGATION-DERIVED WASTES

Investigation-derived waste (IDW) generated during the sampling event consisted of well purge water, used PPE, and disposable sampling supplies. During sampling, purge water was stored on site in 5-gallon buckets. At the completion of sampling, the water was transported to the City of Vancouver's operations center and disposed of in accordance with the disposal permit issued to Weston by the city. Approximately 80 gallons of water was disposed. Personnel protective equipment and other solid wastes were disposed of in a dumpster.

2.6 DISCUSSION AND CONCLUSIONS

Chromium concentrations in onsite "A" zone groundwater in and around the ISRM Treatment Wall were less than 10 ug/L (using dissolved chromium concentrations where available). Chromium concentrations in groundwater between the ISRM Treatment Wall and East 1st Street were also less than 10 ug/L. Chromium concentrations in well B87-8, located south of East 1st Street, were 13 ug/L. Concentrations of chromium in samples collected during this round of sampling were very similar to those collected in June 2006. In general, the chromium concentrations in groundwater on and downgradient of the site were relatively uniform during the September 2006 sampling event with almost all chromium concentration less than 10 ug/L.

The deeper "B" zone groundwater downgradient of the site contained chromium in concentrations similar to that in the "A" zone. Chromium concentrations in "B" zone groundwater on and downgradient of the site were less than 5 ug/L (using dissolved chromium concentrations where available).

Wells RA-MW-15B and RA-MW-16B have had anomalously elevated chromium concentrations in unfiltered samples beginning in May 2005. Small black particulate was also observed in samples collected from these wells in December 2005 and typically appears in samples collected since that time in these wells. Therefore, both unfiltered and filtered samples were collected from these wells during this sampling event regardless of turbidity. The unfiltered sample from well RA-MW-15B had a chromium concentration of 33 ug/L whereas the filtered sample had a

chromium concentration of 2.8 ug/L. The unfiltered sample from well RA-MW-16B had a chromium concentration of 45 ug/L whereas the filtered sample had a chromium concentration of 1.3 ug/L

Wells RA-MW-15A and RA-MW-16A located downgradient of the treatment wall had evidence that reagents had reached this well. These wells either had a slight yellow green color or smelled of sulfur indicating reagents have migrated to these wells.

Dissolved oxygen data collected from within the ISRM Treatment Wall indicates that an area of reducing conditions still exists implying the hexavalent chromium treatment zone is still active. Most locations within the treatment wall contain dissolved oxygen at concentrations less than 3.0 mg/L and negative oxygen reduction potential (ORP) implying reducing conditions are present.

Sulfur/sulfate concentrations within the ISRM Treatment Wall have fluctuated while sulfur/sulfate concentrations downgradient of the ISRM Treatment Wall have generally increased since February 2004. Sulfur/sulfate concentrations in well B87-8 and B85-4 located across East 1st Street (downgradient of the site) have increased by a factor of approximately 2 to 3 since February 2004. Sulfur and sulfate concentrations were less than 150 mg/L and 400 mg/L in most locations sampled during September.

Overall, the chromium concentrations during this round of sampling are similar to previous rounds.

SECTION 3

ANALYTICAL METHODS AND DATA VALIDATION

3.1 ANALYTICAL METHODS REQUIREMENTS AND DATA VALIDATION

The laboratory data quality assurance review and validation of analytical results for 40 water samples, Project Number 1745-06, collected between 25 September 2006 and 28 September 2006 from the Frontier Hard Chrome site has been completed. This review incorporates sample results for other metals for assessment purposes, but applies only to the following analyses:

- Total recoverable and dissolved chromium by Washington State Department of Ecology's (WDOE) Manchester Environmental Laboratory (MEL), of Port Orchard, Washington, following EPA Method 200.8 – inductively-coupled plasma/mass spectrometry (IC/MS).

The quality assurance review was performed on the laboratory data sheets and the WDOE memorandum to ensure that the analytical results met data quality objectives for the project. All laboratory quality assurance results as applicable (e.g., holding times, blank sample analysis, matrix spike/duplicate analysis, laboratory control sample analysis) supplied to Weston for the analyses met acceptance criteria specified in the work plan (Weston 2004), with the following exception.

- The relative percent difference (RPD) between analysis of field duplicate samples collected from monitoring well RAMW12A was determined to be 52.2 percent. Field notes indicate significant amounts of a black particulate material was present in the samples. Total recoverable chromium results for samples RAMW12A and its associated field duplicate sample were qualified as estimated concentrations (J). No other data were qualified for this event.

No other QA/QC exceptions were noted in the data review. Upon consideration of the data qualifications noted above and the project data quality objectives specified in the QAPP, the data are ACCEPTABLE for use except where flagged with data qualifiers that modify the usefulness of the individual values.

Data validation documentation is provided in Appendix C.

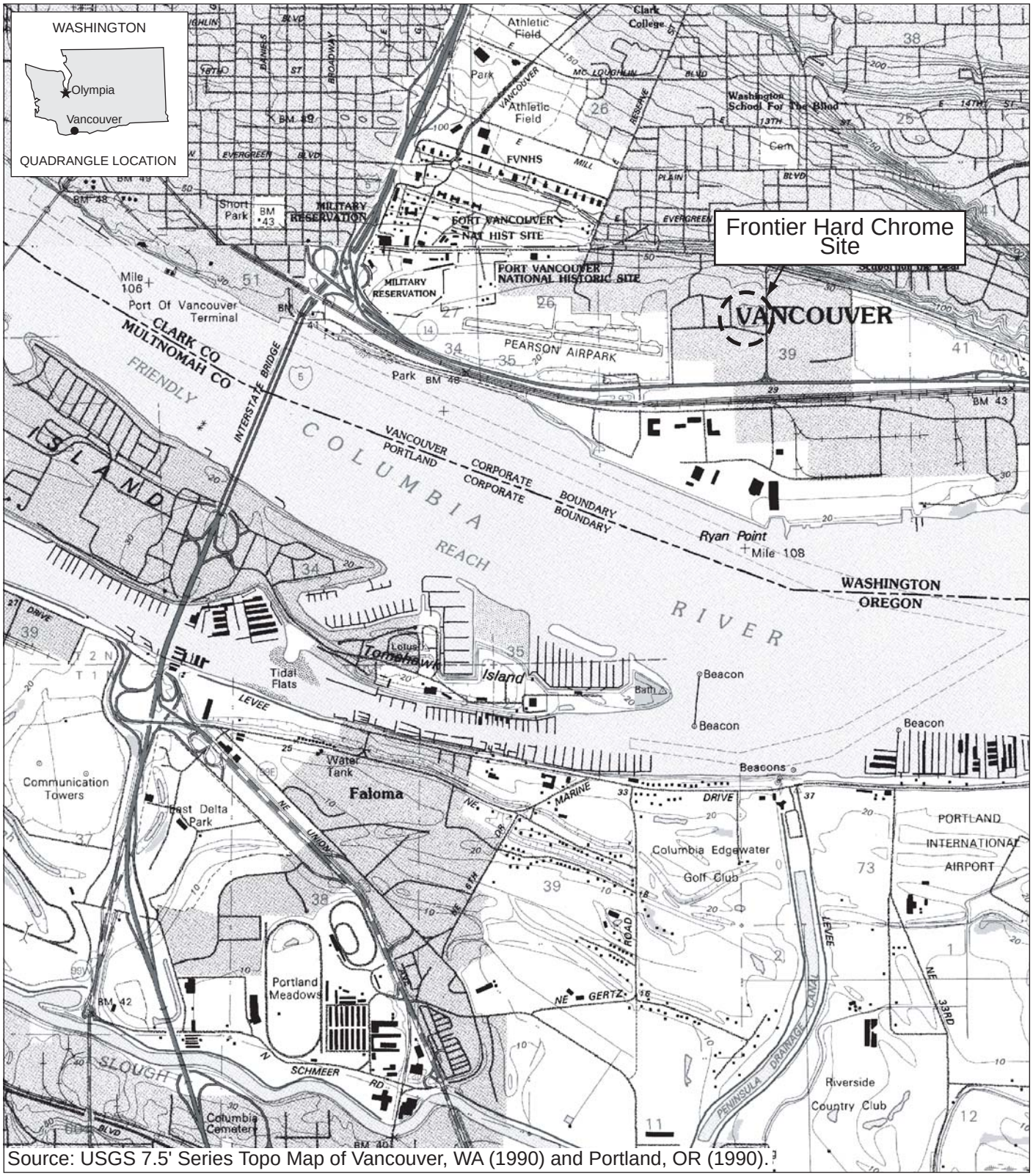
SECTION 4

REFERENCES

EPA (United States Environmental Protection Agency), 2003. Statement of Work for Long Term Response Action. Frontier Hard Chrome, Vancouver, WA. December 30th, 2003.

Weston (Weston Solutions, Inc.), 2004. Frontier Hard Chrome Long Term Monitoring Plan. Prepared for the U.S. Environmental Protection Agency, Region 10, Seattle, Washington. February.

FIGURES



Source: USGS 7.5' Series Topo Map of Vancouver, WA (1990) and Portland, OR (1990).

0 1000 2000

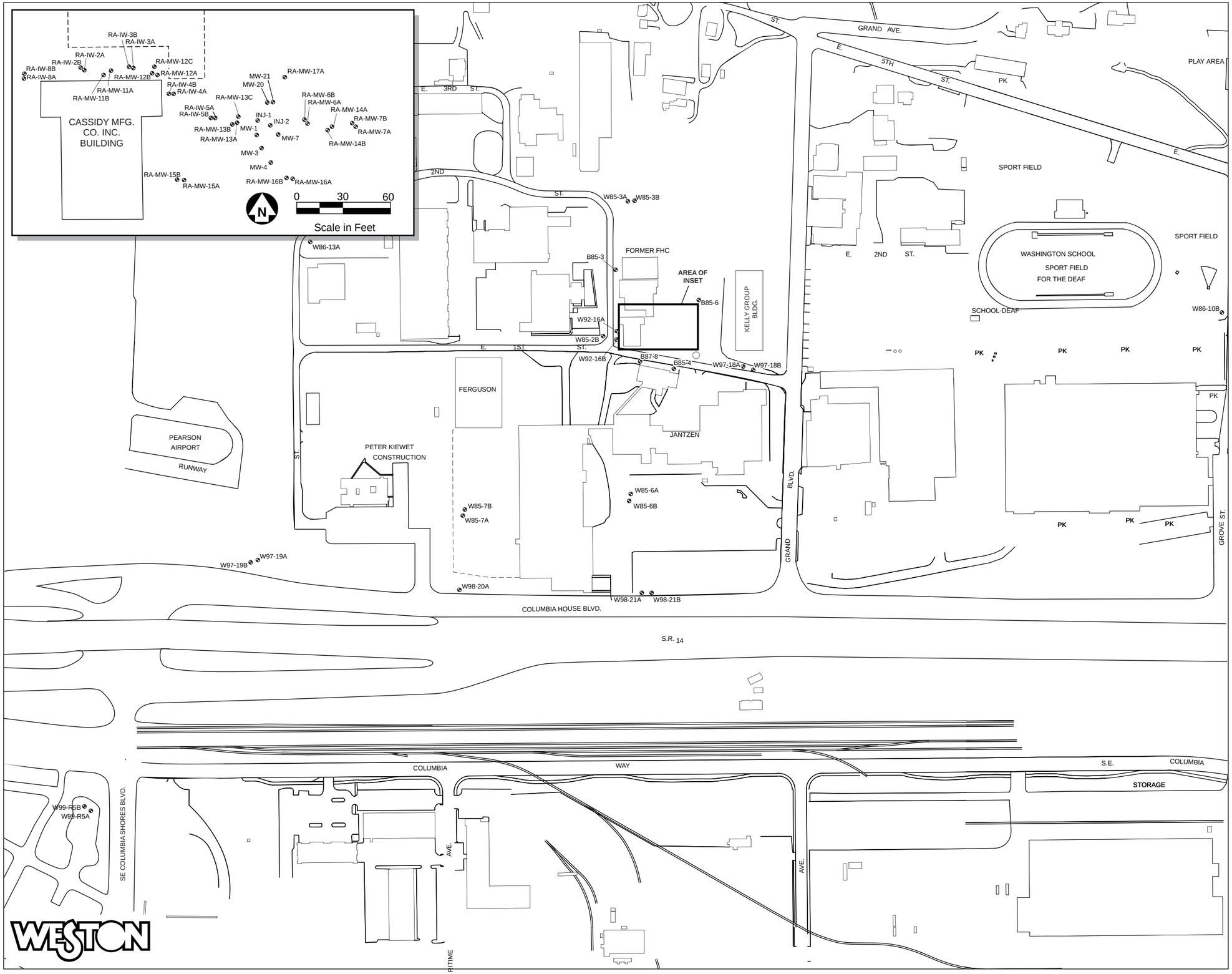
Scale in Feet

Frontier Hard Chrome
Vancouver, Washington
Vicinity Map

Figure

1

06-0100 Fig1.ai



LEGEND

W85-5B — Monitoring Well Location and ID

– – – – Fence

0 150 300

N

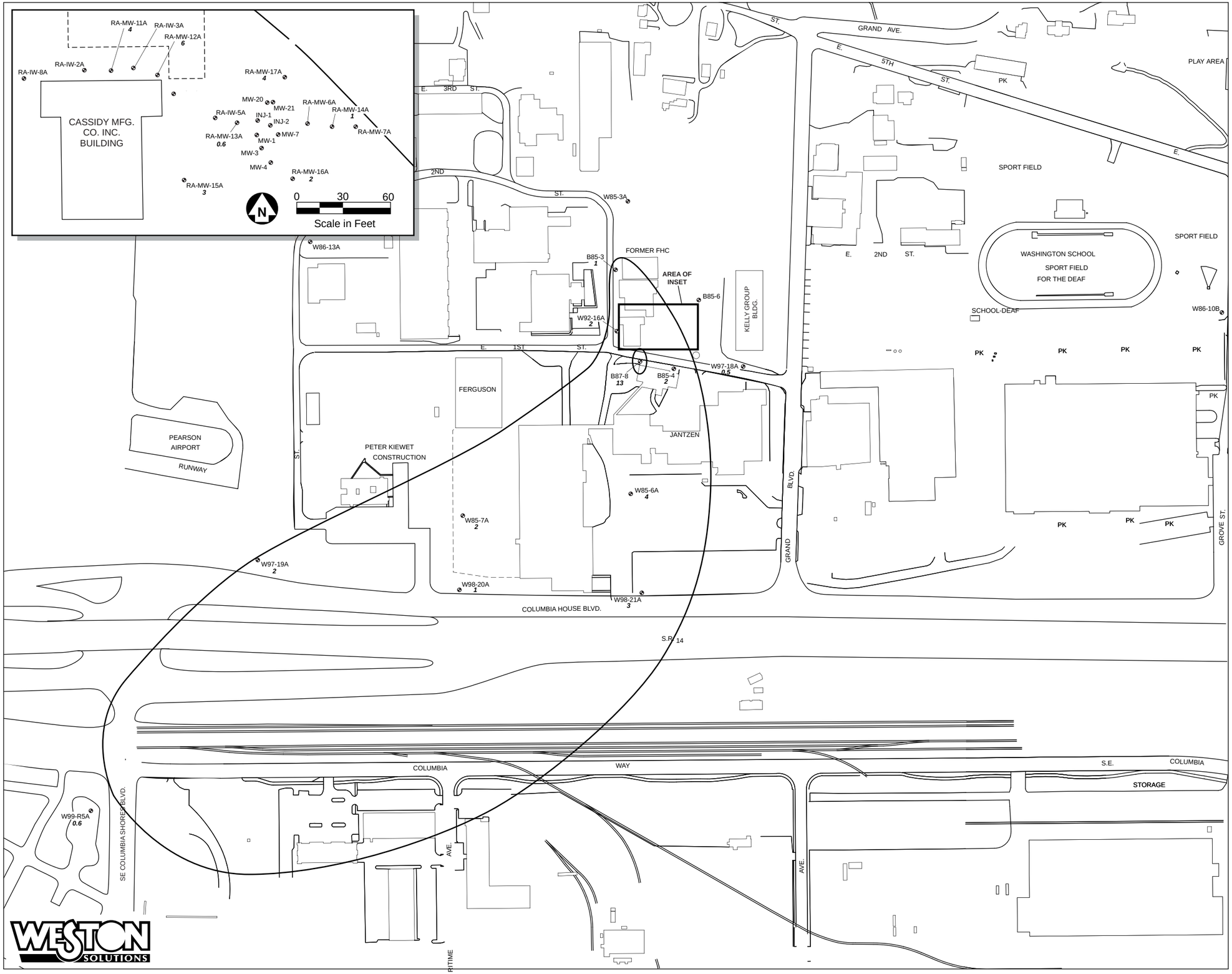
Scale in Feet

Frontier Hard Chrome
Vancouver, Washingto
Monitoring Well Locations

Figure
2

WESTON

06-0100 Fig 2.ai



LEGEND

- W85-7A — Monitoring Well Location and ID
- 1.7 — Chromium Concentration (µg/L)
- —10— Concentration Contour (µg/L)

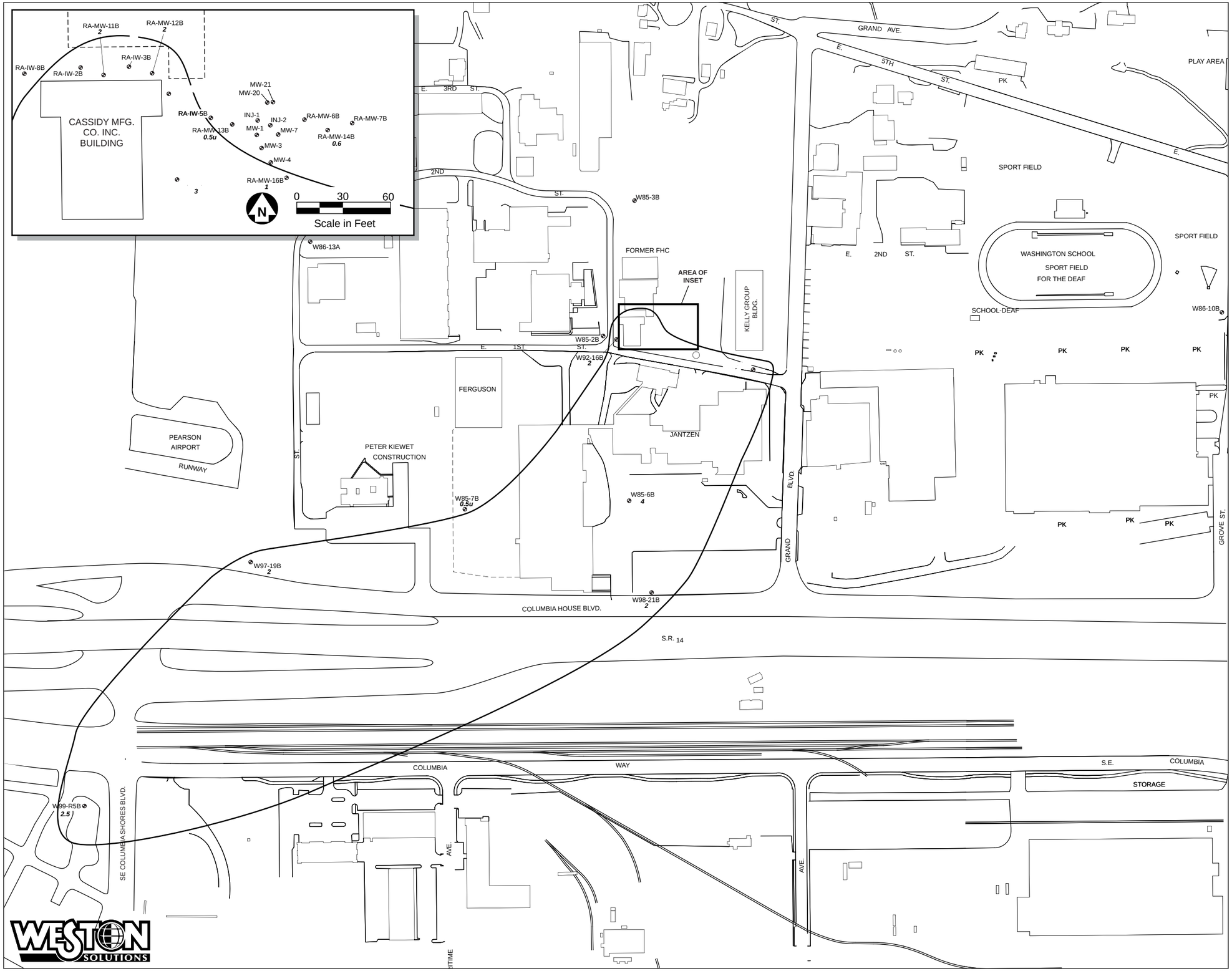
0 150 300
Scale in Feet

Frontier Hard Chrome Vancouver, Washington Chromium Concentrations in Zone A Groundwater September 2006

Figure
3

WESTON SOLUTIONS

06-0100 Fig3.ai



LEGEND

- W85-7A — Monitoring Well Location and ID
- 18 — Chromium Concentration (µg/L)
- 10 — Concentration Contour (µg/L)

0 150 300

Scale in Feet

Frontier Hard Chrome Vancouver, Washington Chromium Concentrations in Zone B Groundwater September 2006

Figure
4

WESTON SOLUTIONS

06-0100 Fig4.ai

LEGEND

- W85-7A — Monitoring Well Location and ID
- 6.32 — Groundwater Elevation (ft. AMSL)
- 6.40 — Groundwater Elevation Contour
- Fence

N

0 150 300

Scale in Feet

Frontier Hard Chrome
Vancouver, Washington
A Zone
Groundwater Elevations
September 28, 2006

Figure
5

WESTON SOLUTIONS

06-0100 Fig5.ai

TABLES

Table 1—Frontier Hard Chrome—Event 8 Chromium Results

Well Number	Concentration (ug/L)		Sample Observations
	Total	Dissolved	
RA-MW-12A	5260	6.0	Purge water initially black, then turned yellow-green as more water purged. Strong sulfur smell. Small shiny particulate in sample; silica? Pumped well dry during purging.
RA-MW-12B	2.4	--	Initial transparent yellow-green color, sulfur smell. Color mostly disappears after purging. As sample sits, it turns cloudy, NTU increases.
RA-MW-12C	1.5	--	
RA-MW-11A	4.1	--	Initial purge water was black, strong sulfur smell. After purging, water cleared up but turned black again over time in sample bottle. When acid added, water cleared up.
RA-MW-11B	1.9	--	Strong sulfur smell.
RA-MW-13A	0.63	--	Moderate yellow-green color and sulfur odor.
RA-MW-13B	0.5U	--	Faint sulfur odor.
RA-MW-13C	5.5	--	
RA-MW-17A	4.0	--	Faint sulfur odor.
RA-MW-14A	1.4	--	Moderate yellow-green color and sulfur odor.
RA-MW-14B	0.64	--	Moderate yellow-green color and sulfur odor.
RA-MW-16A	1.7	--	Clear, slight yellow-green color
RA-MW-16B	45	1.3	Small black particulate in pre-filtered sample.
RA-MW-15A	2.7	--	Faint sulfur odor.
RA-MW-15B	33	2.75	
B87-8	45.6	13.4	Small black particulate in pre-filtered sample.
B85-3	0.9	--	Moderate sulfur odor and yellow-green color.
W92-16A	2.1	--	Small black particulate in sample at start and end of sampling.
W92-16B	1.6	--	Small black particulate in sample at start of sampling.
B85-4	1.5	--	Small black particulate in sample at start of sampling.
W97-18A	0.53	--	
W97-18B	1.3	--	
W85-7A	1.6	--	
W85-7B	0.5U	--	
W97-19A	2.1	--	
W97-19B	2.1	--	
W98-20A	1.0	--	
W99-R5A	0.55	--	Water level low, minimal purging completed.
W99-R5B	2.5	--	Water level low, minimal purging completed.
W98-21A	2.5	--	
W98-21B	2.2	--	
W85-6A	4.1	--	
W85-6B	3.8	3.27	

-- denotes no sample collected

U: denotes analyte was not detected

J: denotes estimate.

Table 2—Frontier Hard Chrome—Event 8 Monitoring Field Parameters[1]

Well Number	Temp C	Spec. Cond. (mS/cm)	DO (mg/L)	pH	ORP (mV)	Sulfur[2] (mg/L)	Sulfate[2] (mg/L)	Turbidity (NTU)
RA-MW-12A	14.9	2.26	17*	8.54	-311			80
RA-MW-12B	14.5	1.19	12.16	7.83	-355			1
RA-MW-12C	14.2	0.53	4.93	7.9	-164			0.4
RA-MW-11A	14.9	1.7	22.5*	6.48	-294	402	1170	0.5
RA-MW-11B	14.7	1.1	4.44	6.85	-317			0.3
RA-MW-13A	14.1	1.13	1	6.96	-153	111	323	2
RA-MW-13B	14.2	0.5	0.49	7.52	-152			2
RA-MW-13C	14.1	0.57	0.8	7.45	-135			9.7
RA-MW-17A	13.9	1.18	0.74	6.42	-106			1
RA-MW-14A	13.6	0.92	0.88	5.98	-80	140	400	0.3
RA-MW-14B	14.0	0.69	0.52	6.4	-98			2
RA-MW-16A	14.8	0.8	0.49	5.96	-125			1
RA-MW-16B	15.2	0.43	0.27	6.09	-155			0.7
RA-MW-15A	15.1	1.27	2.89	6.09	-52			0.2
RA-MW-15B	17.2	0.46	1.25	6.61	76			4
B87-8	14.4	0.36	0.52	6.61	160	42	117	13
B85-3	14.6	0.72	1.04	6.33	-53			1
W92-16A	15.5	0.37	0.32	5.87	129			4
W92-16B	15.4	0.32	2.12	6.35	253			0.7
B85-4	14.5	0.56	1.61	6.28	179	59	169	1
W97-18A	13.8	0.15	1.45	5.08	317			6
W97-18B	13.8	0.19	4.25	6.25	233			3
W85-7A	15.9	0.16	3.09	5.69	246	6	16	0.1
W85-7B	14.4	0.01	3.77	5.39	259			0.8
W97-19A	15.3	0.21	3.5	5.53	311			0.4
W97-19B	15.2	0.2	3.43	5.89	295			1
W98-20A	15.3	0.18	3.63	4.9	366			0.1
W99-R5A	--	--	--	--	--	5	14	1
W99-R5B	--	--	--	--	--			1
W98-21A	15.0	0.25	2.59	4.8	484			0.2
W98-21B	14.7	0.24	2.42	5.55	471			0.1
W85-6A	15.3	0.24	2.06	5.47	356	15	41	0.1
W85-6B	15.1	0.11	3.83	7.16	340			14

[1]Parameters measured after readings stabilized.

[2]Sulfur and sulfate data obtained from laboratory analyses.

*: Denotes sulfur interference with dissolved oxygen readings.

Table 3—Comparison of Conventional Parameters

Well #	Temp (C)								Conductivity (mS/cm)							
	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Sep-06	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Sep-06
RA-MW-12A	14.9	15.9	17.9	15.2	14.9	14.6	14.3	14.9	6.01	5.4	4	3.32	2.52	2.47	2.37	2.26
RA-MW-12B	14.4	16.6	16.7	15.6	14.3	14.9	14.4	14.5	2.25	1.19	1.52	2.56	2.47	1.34	1.39	1.19
RA-MW-12C	14.4	16.5	16.6	15.1	14.2	14.3	14.2	14.2	2.18	1.34	1.13	0.68	1.09	0.69	0.88	0.53
RA-MW-11A	15.7	16.5	17.4	15.7	15.0	15.1	15.1	14.9	1.67	1.89	2.02	1.48	1.82	2.01	1.46	1.7
RA-MW-11B	14.9	16.3	17	15.6	14.9	14.7	14.7	14.7	1.49	2.08	2.02	1.72	2.25	1.17	0.94	1.1
RA-MW-13A	15	14.6	15.73	14.9	14.5	14.3	13.7	14.1	5.21	2.42	3.29	2.83	2.49	2.17	1.66	1.13
RA-MW-13B	14.8	14.7	15.4	14.9	14.2	14.3	14.1	14.2	3.73	1.38	2.15	2.41	2.16	0.81	0.82	0.5
RA-MW-13C	14.2	15	14.9	14.5	14.3	13.8	13.8	14.1	3.07	1.82	1.41	1.28	0.71	0.79	0.82	0.57
RA-MW-17A	14.3	15.3	16.7	15.1	14.5	13.7	--	13.9	1.8	1.8	1.8	1.39	1.18	1.3	--	1.18
RA-MW-14A	13.9	14.3	15.3	14.6	14.7	10.8	--	13.6	1.43	1.71	1.96	1.08	0.88	0.87	--	0.92
RA-MW-14B	14	14.9	15.5	14.5	14.1	12.3	--	14.0	1.56	1.21	0.98	1.08	1	0.78	--	0.69
RA-MW-16A	14.3	14.9	16	14.9	15.1	13.3	13.4	14.8	2.95	1.46	2	1.7	1.07	1.04	1.01	0.8
RA-MW-16B	14.3	14.6	16	14.7	13.9	13.7	13.8	15.2	2.42	1.19	1.4	1.81	0.92	0.67	0.51	0.43
RA-MW-15A	14.3	14.5	15	15	14.7	14.8	14.7	15.1	1.88	1.04	1.08	1.3	1.42	1.53	1.44	1.27
RA-MW-15B	13.9	14.4	15.4	14.7	14.1	14.0	14.5	17.2	0.47	0.86	0.68	0.64	0.91	0.92	0.8	0.46
B87-8	14.5	14.7	15.8	15.2	14.7	14.4	14.5	14.4	0.26	0.55	0.36	0.29	0.24	0.38	0.27	0.36
B85-3	14.6	14.8	15.2	15.8	14.4	14.1	13.6	14.6	0.99	0.90	0.98	0.81	0.54	0.74	0.64	0.72
W92-16A	14.2	15.6	16.1	15.3	14.0	13.8	14.1	15.5	0.33	0.25	0.27	0.23	0.24	0.28	0.28	0.37
W92-16B	14.1	14.7	16.2	15.2	13.7	13.7	13.8	15.4	1.17	1.37	0.95	0.66	0.09	0.34	0.42	0.32
B85-4	14.1	14.4	15.1	14.4	13.9	13.5	14.3	14.5	0.41	1.17	0.51	0.71	0.28	0.74	0.33	0.56
W97-18A	11.3	11.0	15.0	12.7	13.9	12.0	--	13.8	0.11	0.09	0.11	0.08	0.1	0.19	--	0.15
W97-18B	11.4	12.4	14.4	13.5	13.0	10.7	--	13.8	0.26	0.24	0.27	0.22	0.19	0.19	--	0.19
W85-7A	11.4	12.6	14.9	13.9	14.5	12.3	13.7	15.9	0.13	0.14	0.21	0.12	0.11	0.1	0.16	0.16
W85-7B	12.1	13.0	14.5	13.6	14.1	12.8	13.4	14.4	0.28	0.31	0.32	0.01	0.01	0.01	0.02	0.01
W97-19A	12.5	13.3	16	14.3	13.8	12.9	--	15.3	0.25	0.26	0.28	0.23	0.23	0.19	--	0.21
W97-19B	12.7	13.3	15.9	15.3	13.3	12.4	--	15.2	0.26	0.26	0.29	0.22	0.06	0.19	--	0.2
W98-20A	13.8	12.5	15.4	14.3	14.3	13.1	--	15.3	0.16	0.15	0.23	0.12	0.12	0.13	--	0.18
W99-R5A	14.2	14.9	15.7	14.8	14.8	14.7	15.1	--	0.24	0.25	0.24	0.22	0.21	0.2	0.2	--
W99-R5B	13.9	14.4	15.6	14.4	14.5	13.9	14.7	--	0.26	0.26	0.27	0.23	0.22	0.22	0.22	--
W98-21A	13.1	14.3	14.2	13.8	13.9	13.8	13.7	15.0	0.16	0.23	0.29	0.45	0.19	0.19	0.22	0.25
W98-21B	13.1	13.6	14	13.8	13.7	13.0	13.7	14.7	0.24	0.27	0.27	0.25	0.18	0.22	0.21	0.24
W85-6A	14.1	14.1	15.5	14			13.7	15.3	0.11	0.33	0.34	299			0.23	0.24
W85-6B	13.6	13.8	16.3	13.7			13.8	15.1	0.31	0.41	0.33	0.26			0.1	0.11

Table 3—Comparison of Conventional Parameters (continued)

Well #	DO (mg/L)								pH							
	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Sep-06	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Sep-06
RA-MW-12A	0.24	0.09	0.2	0.13	0.04	0	52.7*	17*	8.86	8.73	8.86	8.98	8.41	8.19	8.46	8.54
RA-MW-12B	0.27	0.07	0.27	0.07	0.05	1.26	45.1*	12.16	7.77	7.83	7.92	8.3	8.68	8.16	7.76	7.83
RA-MW-12C	0.2	0.14	0.42	0.25	0.07	1.1	5.16	4.93	8.13	7.92	8.09	7.95	8.14	7.89	7.92	7.9
RA-MW-11A	0.32	0.10	0.66	6.69	0.16	0	24.2*	22.5*	7.51	7.53	7	6.52	6.64	6.64	6.46	6.48
RA-MW-11B	0.19	0.15	0.5	0.14	0.1	0.19	26.6*	4.44	7.66	7.9	7.2	6.7	6.73	7	6.69	6.85
RA-MW-13A	1.63	0.17	1.13	0.53	0.11	0.38	0.27	1	7.15	7.15	7.03	6.7	6.86	6.82	6.82	6.96
RA-MW-13B	0.73	0.16	0.73	0.51	0.21	0.45	0.35	0.49	7.23	7.56	7.3	6.86	6.99	7.15	6.95	7.52
RA-MW-13C	0.22	0.15	0.43	1.4	2.98	0.96	0.41	0.8	7.36	7.35	7.44	7.33	7.48	7.25	7.25	7.45
RA-MW-17A	0.6	0.19	1.99	0.6	0.2	3.69	--	0.74	6.55	6.43	6.61	6.2	6.39	6.5	--	6.42
RA-MW-14A	0.89	0.22	5.96	0.51	0.22	6.74	--	0.88	6.64	6.81	6.99	6.5	6.6	6.6	--	5.98
RA-MW-14B	1.08	0.10	2.77	0.42	0.12	2.58	--	0.52	6.9	7.14	7.33	6.75	6.78	6.87	--	6.4
RA-MW-16A	0.73	0.27	1.39	1.6	0.11	5.4	0.54	0.49	6.61	6.61	6.75	6.42	6.44	6.62	6.44	5.96
RA-MW-16B	0.75	0.15	0.86	0.75	0.33	1.85	0.27	0.27	6.42	7.12	7.09	6.31	7.12	7.06	6.85	6.09
RA-MW-15A	0.33	0.21	1.53	0.47	0.15	8.34	0.47	2.89	6.35	6.37	6.74	6.2	6.3	6.47	6.28	6.09
RA-MW-15B	0.22	0.10	0.74	0.44	0.18	0.79	0.3	1.25	6.35	6.83	7.18	6.39	6.39	6.51	6.26	6.61
B87-8	0.13	1.03	1.06	0.35	0.28	0.53	0.37	0.52	6.55	6.31	6.73	6.54	6.68	6.57	6.35	6.61
B85-3	1.11	0.16	1.57	4.5	0.12	2.97	0.22	1.04	6.49	6.68	6.91	6.39	6.7	6.64	6.42	6.33
W92-16A	0.98	0.13	2.49	3.1	0.28	0.15	0.45	0.32	6.42	6.42	6.72	6.6	6.56	6.6	6.67	5.87
W92-16B	0.14	0.53	1.97	3.4	5.4	1.02	0.54	2.12	7.51	7.58	7.63	7.59	6.88	7.54	7.38	6.35
B85-4	0.65	1.37	1.5	0.33	0.2	0.22	0.52	1.61	6.14	6.26	6.53	6.22	6.51	6.49	6.21	6.28
W97-18A	1.27	0.74	1.09	0.5	1.1	4	--	1.45	5.83	5.96	6.19	6.17	6.78	6.57	--	5.08
W97-18B	2.01	5.56	4.52	4.9	2	1.17	--	4.25	6.57	6.35	6.67	6.41	6.6	6.16	--	6.25
W85-7A	4.05	3.17	2.18	4.3	2.2	6.7	5.89	3.09	6.24	6.04	6.26	6.2	6.3	6.35	6.24	5.69
W85-7B	2.78	5.11	6.1	8.7	4	10.3	10.96	3.77	6.63	6.51	6.71	5.91	6.18	6.14	6.37	5.39
W97-19A	4.72	1.79	22.73	4.6	0.97	3.51	--	3.5	6.35	6.24	6.28	6.35	6.59	6.41	--	5.53
W97-19B	1.81	1.31	2.6	2.6	1.1	2.99	--	3.43	6.68	6.49	6.3	6.47	6.68	6.68	--	5.89
W98-20A	4.92	3.76	5.5	5	3.2	5.1	--	3.63	6.01	5.91	6.32	5.97	6.29	6.18	--	4.9
W99-R5A	4.72	4.26	5.6	5.3	3.3	1.83	5.1	--	6.03	5.98	6.28	6.21	6.22	6.28	6.23	--
W99-R5B	3.97	2.71	4.7	5.1	1.9	2.03	4.2	--	6.2	6.23	6.55	6.33	6.63	6.55	6.26	--
W98-21A	1.29	1.49	3.03	13.3	1.2	1.05	3.26	2.59	5.92	6.07	6.68	6.18	6.3	6.25	6.11	4.8
W98-21B	1.24	3.29	2.82	17.7	3.9	1.08	3.37	2.42	6.04	6.07	6.9	6.24	6.64	6.36	6.07	5.55
W85-6A	4.92	0.43	0.85	4.9			1.86	2.06	6.23	6.22	6.4	6.36			6.25	5.47
W85-6B	3.46	6.13	6.54	5.5			7.87	3.83	6.4	6.42	6.68	6.62			8.93	7.16

*: Denotes sulfur/sulfate interference with dissolved oxygen readings.

Table 3—Comparison of Conventional Parameters (continued)

Well #	ORP (mV)							
	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Sep-06
RA-MW-12A	-468	-466	-430	-417	-403	-393	-363	-311
RA-MW-12B	-363	-321	-315	-415	-414	-345	-327	-355
RA-MW-12C	-282	-179	-154	-239	-314	-234	-191	-164
RA-MW-11A	-384	-391	-316	-110	-241	-246	-216	-294
RA-MW-11B	-394	-393	-332	-296	-289	-301	-278	-317
RA-MW-13A	-155	-102	-97	-94	-204	-176	-93	-153
RA-MW-13B	-129	-123	-104	-105	-125	-197	-85	-152
RA-MW-13C	-136	-126	-116	-142	-33	-175	-112	-135
RA-MW-17A	-91	-40	-7	-5	-27	-89	--	-106
RA-MW-14A	-77	-41	-54	-75	-82	-136	--	-80
RA-MW-14B	-112	-95	-102	-112	-134	-133	--	-98
RA-MW-16A	-94	-45	-58	-156	-103	-160	-93	-125
RA-MW-16B	-57	-70	-60	-85	-130	-131	-66	-155
RA-MW-15A	-47	4	39	10	-12	-137	-28	-52
RA-MW-15B	-5	28	15	17	-11	16	34	76
B87-8	-8	31	17	199	2	73	86	160
B85-3	-7	-107	-37	-47	-93	-62	-43	-53
W92-16A	1	-14	30	110	110	-32	61	129
W92-16B	-116	-61	-60	73	119	-103	30	253
B85-4	10	41	59	218	-26	75	86	179
W97-18A	32	57	67	103	58	137	--	317
W97-18B	57	63	60	188	83	152	--	233
W85-7A	68	83	57	197	116	113	127	246
W85-7B	59	73	66	215	132	146	167	259
W97-19A	71	94	72	218	69	149	--	311
W97-19B	56	86	56	52	76	142	--	295
W98-20A	52	116	84	219	116	171	--	366
W99-R5A	58	96	97	153	123	197	116	--
W99-R5B	58	78	74	201	92	204	111	--
W98-21A	28	69	79	182	113	160	114	484
W98-21B	33	72	47	202	121	161	117	471
W85-6A	17	57	86	163			107	356
W85-6B	19	76	72	159			79	340

Table 3—Comparison of Conventional Parameters (continued)

Well #	Sulfur (mg/L)								Sulfate (mg/L)							
	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Sep-06	Feb-04	Apr-04	Aug-04	May-05	Dec-05	Mar-06	Jun-06	Sep-06
RA-MW-12A																
RA-MW-12B																
RA-MW-12C																
RA-MW-11A	286	296	304	285	460	448	322	402	620	751	1040	736	1200	3040	993	1170
RA-MW-11B																
RA-MW-13A	743	246	324	372	363	310	213	111	1960	712	1056	985	971	1980	682	323
RA-MW-13B																
RA-MW-13C																
RA-MW-17A																
RA-MW-14A	189	228	214	136	122	158	124	140	477	635	697	357	351	429	396	400
RA-MW-14B																
RA-MW-16A																
RA-MW-16B																
RA-MW-15A																
RA-MW-15B																
B87-8	9	52	22	17	23	48	21	42	21	137	73	170	63	125	74	117
B85-3																
W92-16A																
W92-16B																
B85-4	23	150	31	87	20	103	21	59	58	410	104	222	50	253	75	169
W97-18A																
W97-18B																
W85-7A	3	4	5	4	4	3	5	6	6	9	15	13	8	8	18	16
W85-7B																
W97-19A																
W97-19B																
W98-20A																
W99-R5A	5	6	4	5	6	7	6	5	12	12	13	15	13	15	18	14
W99-R5B																
W98-21A					8	10							19	25		
W98-21B																
W85-6A		15	14	18	--	--	12	15	5	36	44	44	--	--	35	41
W85-6B																

Table 4—Frontier Hard Chrome—Event 8 Ground Water Elevations 28 September 2006

Well No.	Time	Casing Elevation (feet)	Depth to Water (feet)	Water level Elevation (AMSL)
W85-3A	1125	26.4	22.13	4.27
W85-3B	1123	26.77	22.5	4.27
W97-18A	1159	25.44	21.22	4.22
W97-18B	1201	25.36	21.13	4.23
B85-4	1153	25.38	21.17	4.21
B87-8	1149	25.95	21.72	4.23
W92-16B	1328	25.51	21.28	4.23
W92-16A	1325	25.62	21.38	4.24
B85-3	1335	24.90	20.61	4.29
W85-7A	1135	22.83	18.64	4.19
W85-7B	1143	23.00	18.80	4.20
W97-19A	1247	22.45	18.28	4.17
W97-19B	1249	21.72	17.63	4.09
W98-20A	1237	23.57	19.34	4.23
W85-6A	1213	25.87	21.61	4.26
W85-6B	1215	26.13	21.91	4.22
W98-21B	1227	25.50	21.27	4.23
W98-21A	1224	25.28	21.06	4.22
W99-R5A	1304	32.26	28.06	4.20
W99-R5B	1305	32.33	28.12	4.21
USGS 14144700 (Stage height of the Columbia River corrected to NGVD 1929)	1200			4.07

[1-]Two different elevation datum's have been used at Frontier Hard Chrome. Weston (12/03) Long-Term Monitoring plan has applied a correction factor (+3.76 feet) using the City of Vancouver's benchmark #108 located near FHC site.

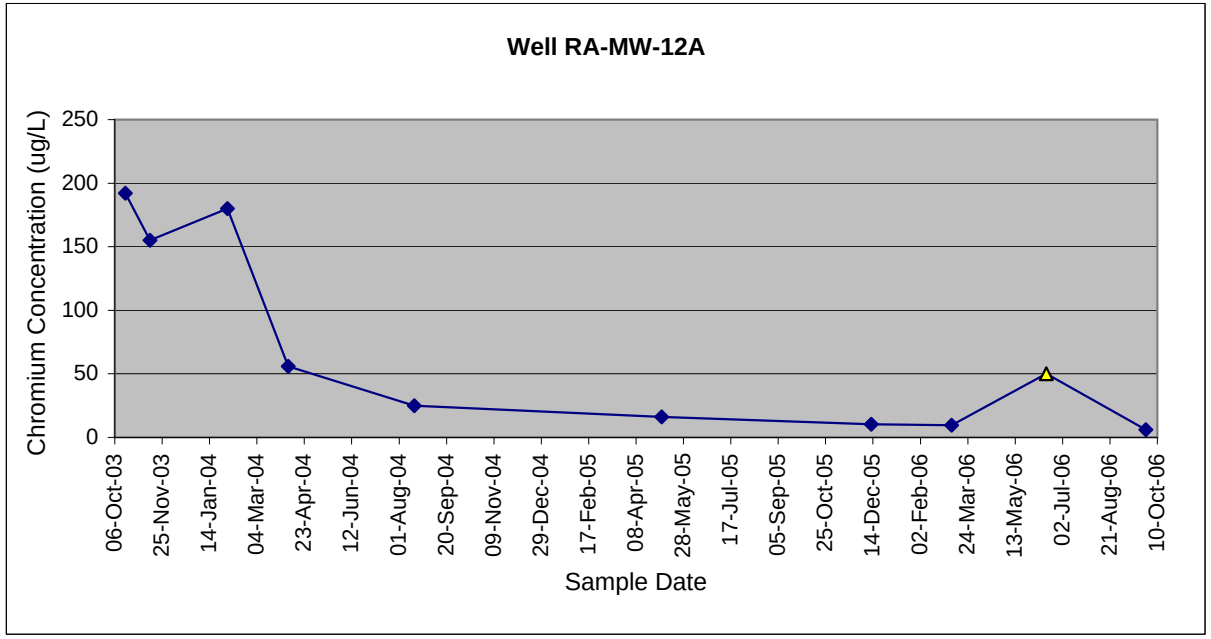
Table 5—Quality Assurance Sample Results - Chromium

Well #	Sample Type	Original Sample Chromium Concentration (mg/L)	Duplicate Sample Chromium Concentration (mg/L)	Relative Percent Difference
RA-MW-12A (total)	Field Duplicate	5260	8980	52%
B87-8 (filtered)	Field Duplicate	13.4	14.3	6.5%

APPENDIX A
GROUNDWATER CHROMIUM CONCENTRATION TRENDS

Well RA-MW-12A

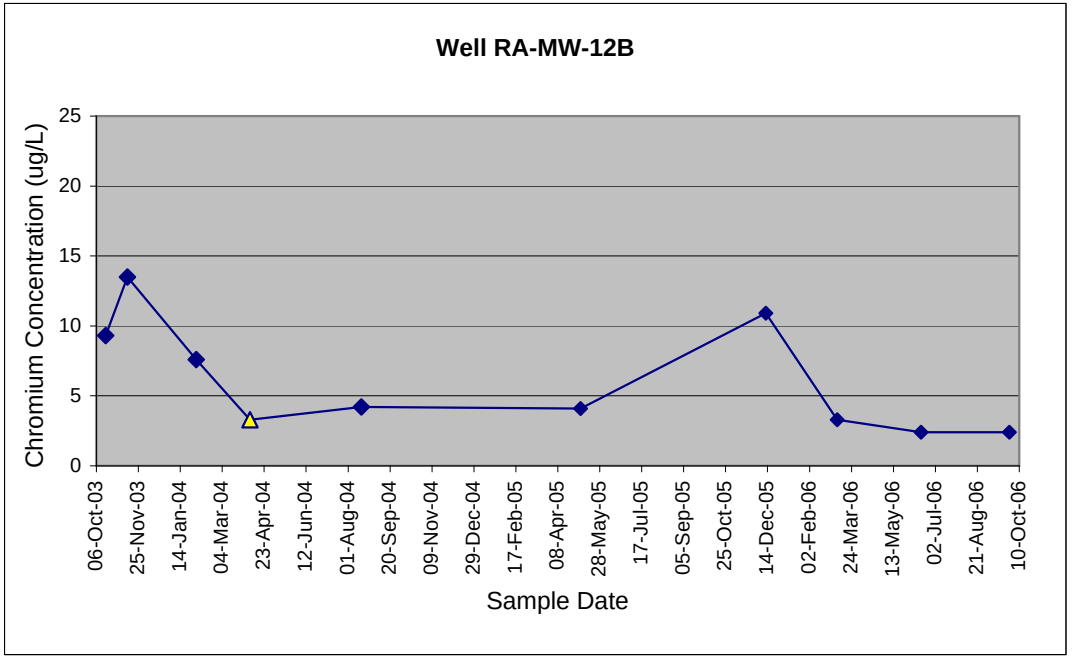
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2524	Water	17-Oct-03	CHROMIUM	192	UG/L		RA-MW-12A	Dissolved	>10
MJ27F5	Water	12-Nov-03	CHROMIUM	155	UG/L		RA-MW-12A	Dissolved	>10
MJ2AF0	Water	02-Feb-04	CHROMIUM	180	UG/L		RA-MW-12A	Total	7
MJ2BH9	Water	06-Apr-04	CHROMIUM	55.8	UG/L		RA-MW-12A	Dissolved	17
MJ4725	Water	17-Aug-04	CHROMIUM	24.9	UG/L		RA-MW-12A	Dissolved	12
184253	Water	5-May-05	CHROMIUM	16	UG/L		RA-MW-12A	Dissolved	32
05504282	Water	12-Dec-05	CHROMIUM	10.2	UG/L		RA-MW-12A	Dissolved	86
104243	Water	7-Mar-06	CHROMIUM	9.6	UG/L		RA-MW-12A	Dissolved	60
244313	Water	15-Jun-06	CHROMIUM	50	UG/L	U	RA-MW-12A	Dissolved	47
394218	Water	28-Sep-06	CHROMIUM	6	UG/L		RA-MW-12A	Dissolved	80



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-12B

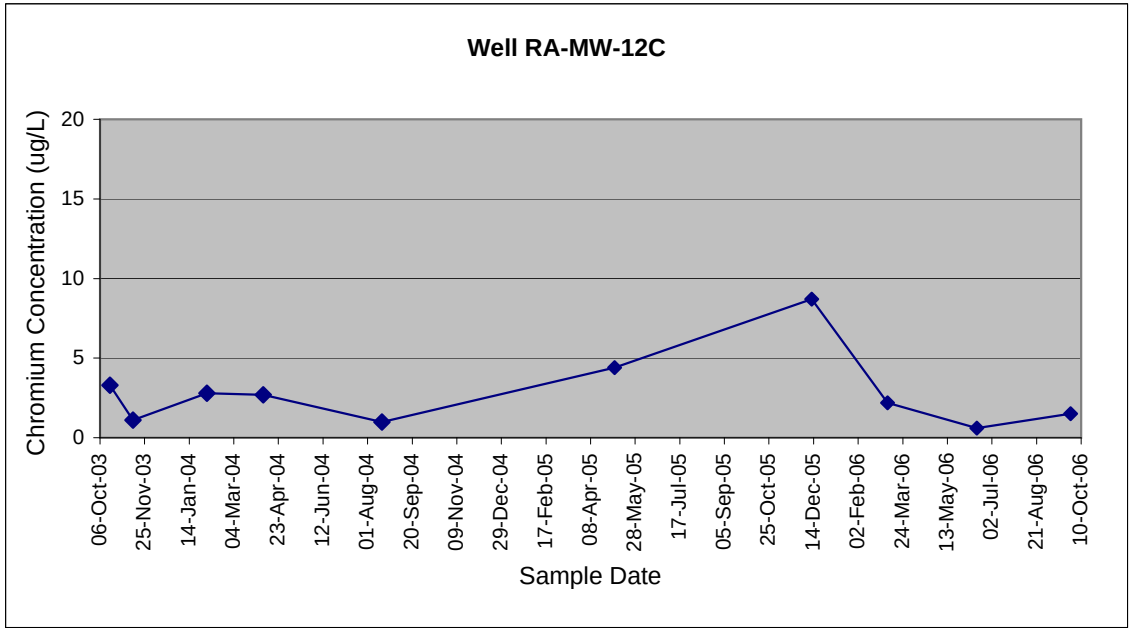
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2526	Water	17-Oct-03	CHROMIUM	9.3	UG/L	BJ	RA-MW-12B	Dissolved	>10
MJ27F7	Water	12-Nov-03	CHROMIUM	13.5	UG/L		RA-MW-12B	Dissolved	>10
MJ2AF1	Water	02-Feb-04	CHROMIUM	7.6	UG/L	J	RA-MW-12B	Total	6
MJ2BJ0	Water	06-Apr-04	CHROMIUM	3.3	UG/L	U	RA-MW-12B	Total	0
MJ4726	Water	17-Aug-04	CHROMIUM	4.2	UG/L	J	RA-MW-12B	Total	2
184254	Water	5-May-05	CHROMIUM	4.1	UG/L		RA-MW-12B	Total	4.5
05504283	Water	12-Dec-05	CHROMIUM	10.9	UG/L		RA-MW-12B	Total	8
104242	Water	7-Mar-06	CHROMIUM	3.3	UG/L		RA-MW-12B	Total	1.7
244315	Water	15-Jun-06	CHROMIUM	2.4	UG/L		RA-MW-12B	Total	14
394216	Water	28-Sep-06	CHROMIUM	2.4	UG/L		RA-MW-12B	Total	1



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-12C

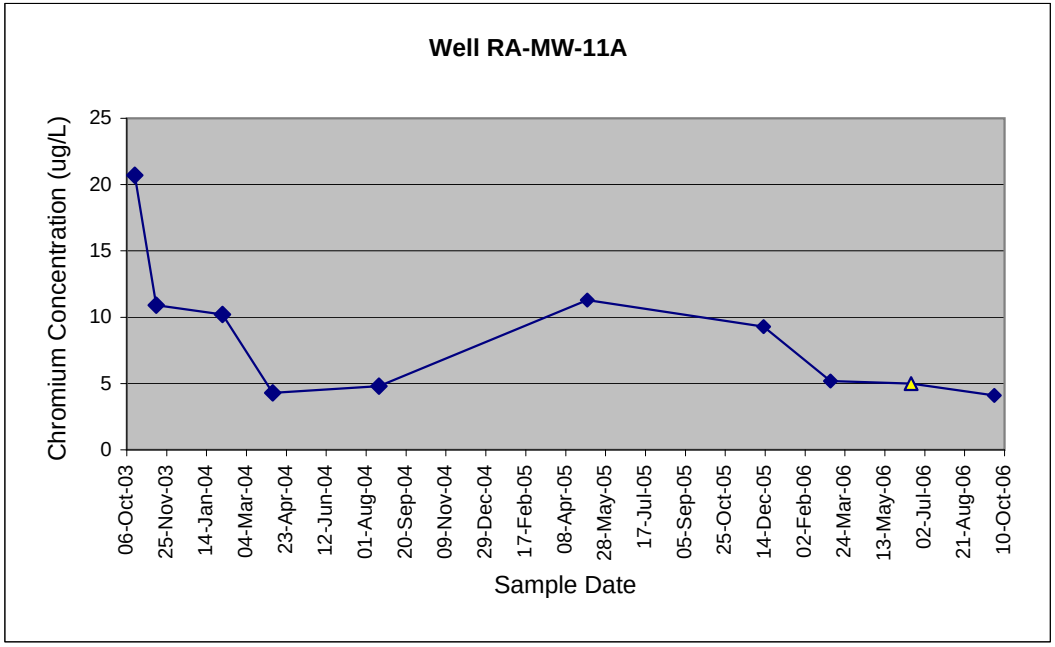
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2528	Water	17-Oct-03	CHROMIUM	3.3	UG/L	BJ	RA-MW-12C	Dissolved	>10
MJ27F9	Water	12-Nov-03	CHROMIUM	1.1	UG/L	BJ	RA-MW-12C	Dissolved	>10
MJ2AF2	Water	03-Feb-04	CHROMIUM	2.8	UG/L	J	RA-MW-12C	Total	1
MJ2BJ1	Water	06-Apr-04	CHROMIUM	2.7	UG/L	J	RA-MW-12C	Total	0
MJ4727	Water	17-Aug-04	CHROMIUM	0.98	UG/L	J	RA-MW-12C	Total	2
184255	Water	5-May-05	CHROMIUM	4.4	UG/L		RA-MW-12C	Total	5.2
05504284	Water	12-Dec-05	CHROMIUM	8.7	UG/L		RA-MW-12C	Total	3
104245	Water	7-Mar-06	CHROMIUM	2.2	UG/L		RA-MW-12C	Total	1
244317	Water	15-Jun-06	CHROMIUM	0.6	UG/L	J	RA-MW-12C	Total	0.3
394215	Water	28-Sep-06	CHROMIUM	1.5	UG/L		RA-MW-12C	Total	0.4



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-11A

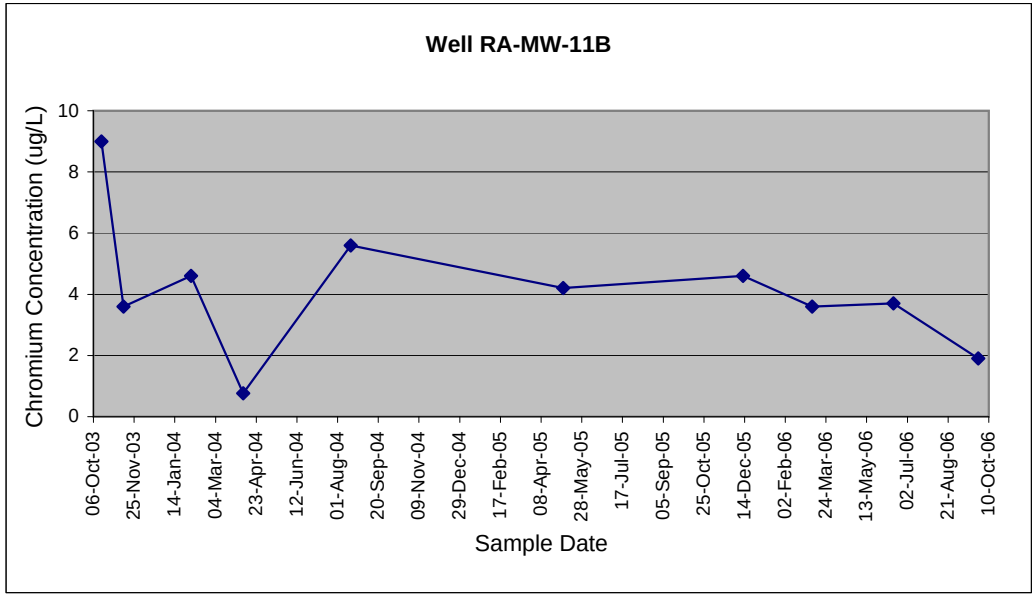
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2516	Water	16-Oct-03	CHROMIUM	20.7	UG/L		RA-MW-11A	Dissolved	>10
MJ27G1	Water	12-Nov-03	CHROMIUM	10.9	UG/L	J	RA-MW-11A	Dissolved	>10
MJ2AF4	Water	03-Feb-04	CHROMIUM	10.2	UG/L		RA-MW-11A	Dissolved	800
MJ2BJ3	Water	06-Apr-04	CHROMIUM	4.3	UG/L	J	RA-MW-11A	Dissolved	783
MJ4728	Water	17-Aug-04	CHROMIUM	4.8	UG/L	J	RA-MW-11A	Total	<10
184250	Water	5-May-05	CHROMIUM	11.3	UG/L		RA-MW-11A	Total	2
05504280	Water	12-Dec-05	CHROMIUM	9.3	UG/L		RA-MW-11A	Total	4
104232	Water	6-Mar-06	CHROMIUM	5.2	UG/L		RA-MW-11A	Total	1
244318	Water	15-Jun-06	CHROMIUM	5	UG/L	UJ	RA-MW-11A	Total	2
394213	Water	27-Sep-06	CHROMIUM	4.1	UG/L		RA-MW-11A	Total	0.5



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well RA-MW-11B

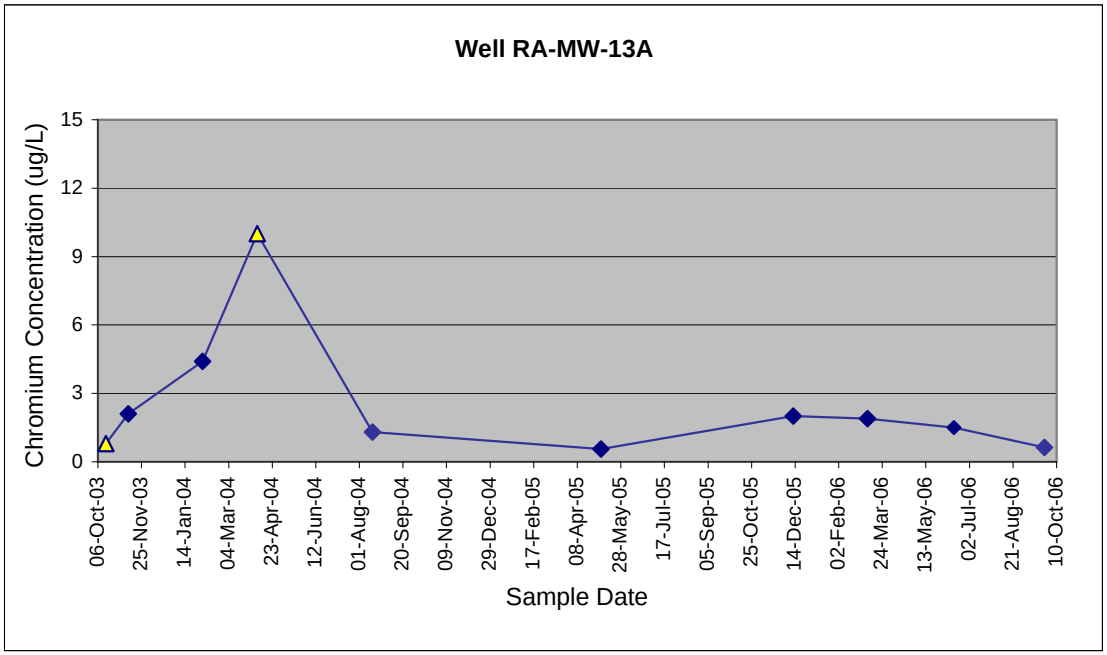
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2518	Water	16-Oct-03	CHROMIUM	9	UG/L	BJ	RA-MW-11B	Dissolved	>10
MJ27G3	Water	12-Nov-03	CHROMIUM	3.6	UG/L	BJ	RA-MW-11B	Dissolved	>10
MJ2AF6	Water	03-Feb-04	CHROMIUM	4.6	UG/L	J	RA-MW-11B	Dissolved	550
MJ2BJ5	Water	7-Apr-04	CHROMIUM	0.76	UG/L	J	RA-MW-11B	Dissolved	1100
MJ4730	Water	17-Aug-04	CHROMIUM	5.6	UG/L	J	RA-MW-11B	Total	114
184251	Water	5-May-05	CHROMIUM	4.2	UG/L		RA-MW-11B	Total	7.1
05504281	Water	12-Dec-05	CHROMIUM	4.6	UG/L		RA-MW-11B	Dissolved	13
104241	Water	7-Mar-06	CHROMIUM	3.6	UG/L		RA-MW-11B	Total	5
244319	Water	15-Jun-06	CHROMIUM	3.7	UG/L		RA-MW-11B	Total	3
394214	Water	27-Sep-06	CHROMIUM	1.9	UG/L		RA-MW-11B	Total	0.3



Note: The total Cr concentration was used for the August 2004 event because the dissolved concentration had a higher detection limit (10U).
Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

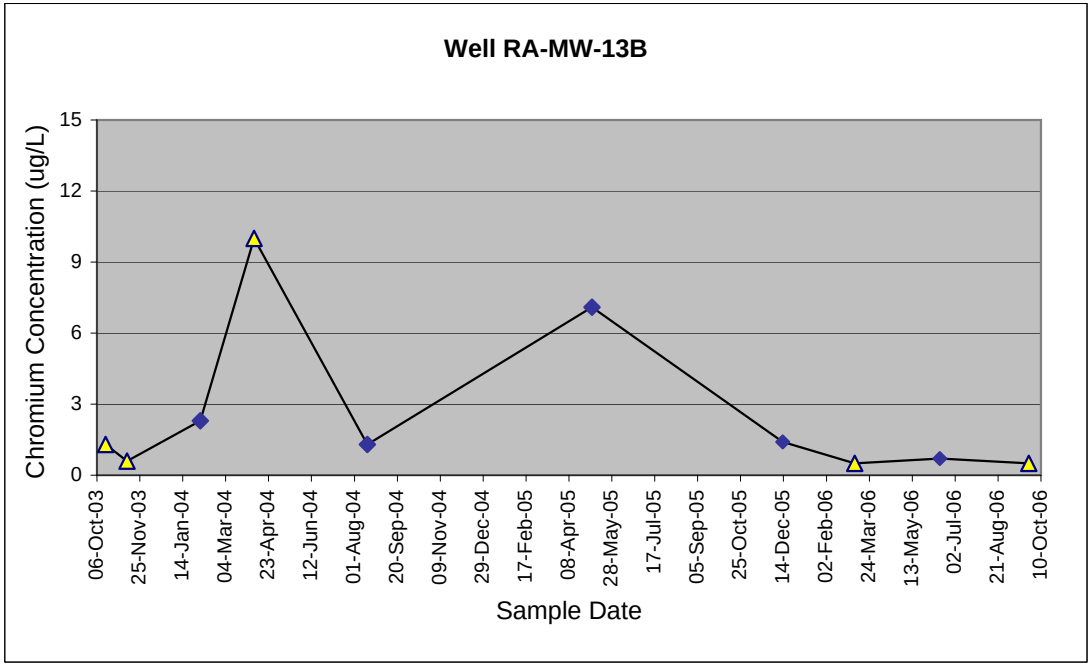
Well RA-MW-13A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2508	Water	15-Oct-03	CHROMIUM	0.8	UG/L	U	RA-MW-13A	Total	<10
MJ27E2	Water	10-Nov-03	CHROMIUM	2.1	UG/L	BJ	RA-MW-13A	Total	>10
MJ2AG1	Water	03-Feb-04	CHROMIUM	4.4	UG/L	J	RA-MW-13A	Total	4
MJ2BH4	Water	6-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-13A	Total	7
MJ4718	Water	16-Aug-04	CHROMIUM	1.3	UG/L	J	RA-MW-13A	Total	9
184261	Water	5-May-05	CHROMIUM	0.56	UG/L		RA-MW-13A	Total	6.4
05504285	Water	12-Dec-05	CHROMIUM	2	UG/L		RA-MW-13A	Total	6.4
104246	Water	7-Mar-06	CHROMIUM	1.9	UG/L		RA-MW-13A	Total	4
244301	Water	14-Jun-06	CHROMIUM	1.5	UG/L		RA-MW-13A	Total	0.7
394194	Water	26-Sep-06	CHROMIUM	0.63	UG/L		RA-MW-13A	Total	2



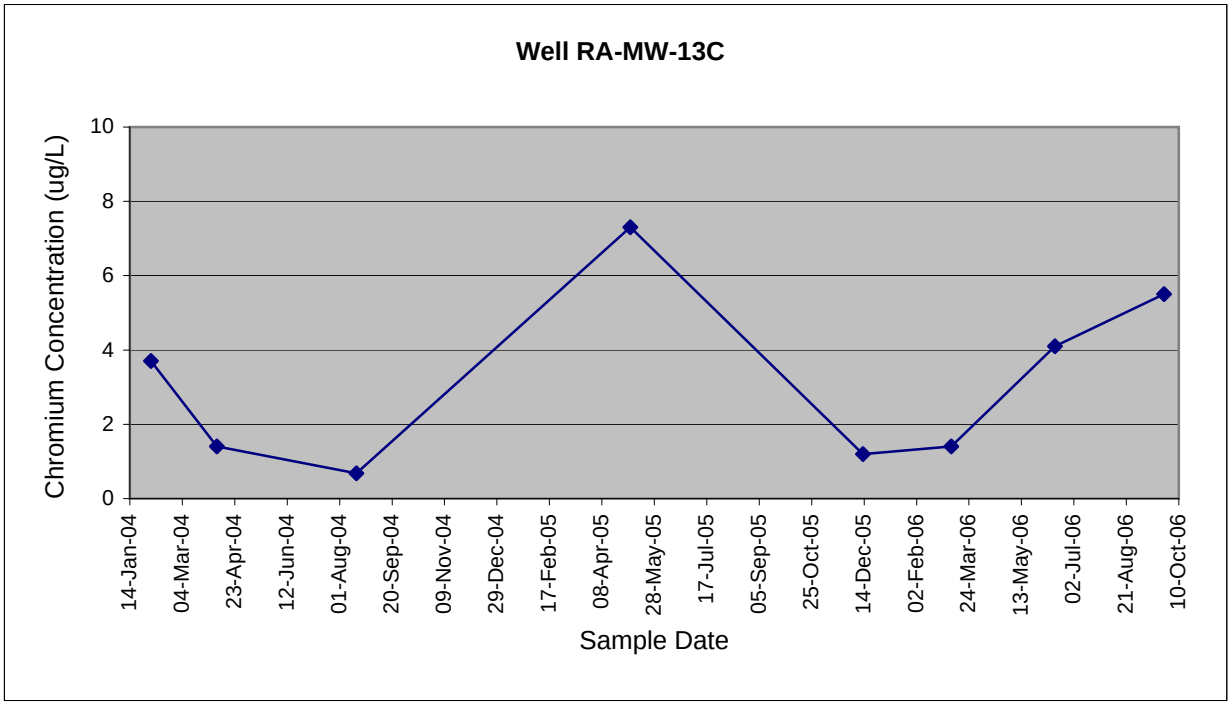
Well RA-MW-13B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2509	Water	16-Oct-03	CHROMIUM	1.3	UG/L	U	RA-MW-13B	Total	<10
MJ27E3	Water	10-Nov-03	CHROMIUM	0.6	UG/L	UJ	RA-MW-13B	Total	<10
MJ2AF8	Water	03-Feb-04	CHROMIUM	2.3	UG/L	J	RA-MW-13B	Total	3
MJ2BH5	Water	6-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-13B	Total	1
MJ4720	Water	16-Aug-04	CHROMIUM	1.3	UG/L	J	RA-MW-13B	Total	2
184262	Water	5-May-05	CHROMIUM	7.1	UG/L		RA-MW-13B	Total	2.8
05504286	Water	13-Dec-05	CHROMIUM	1.4	UG/L		RA-MW-13B	Total	1.7
104247	Water	7-Mar-06	CHROMIUM	0.5	UG/L	U	RA-MW-13B	Total	0
244302	Water	14-Jun-06	CHROMIUM	0.7	UG/L		RA-MW-13B	Total	0.8
394195	Water	26-Sep-06	CHROMIUM	0.5	UG/L	U	RA-MW-13B	Total	2



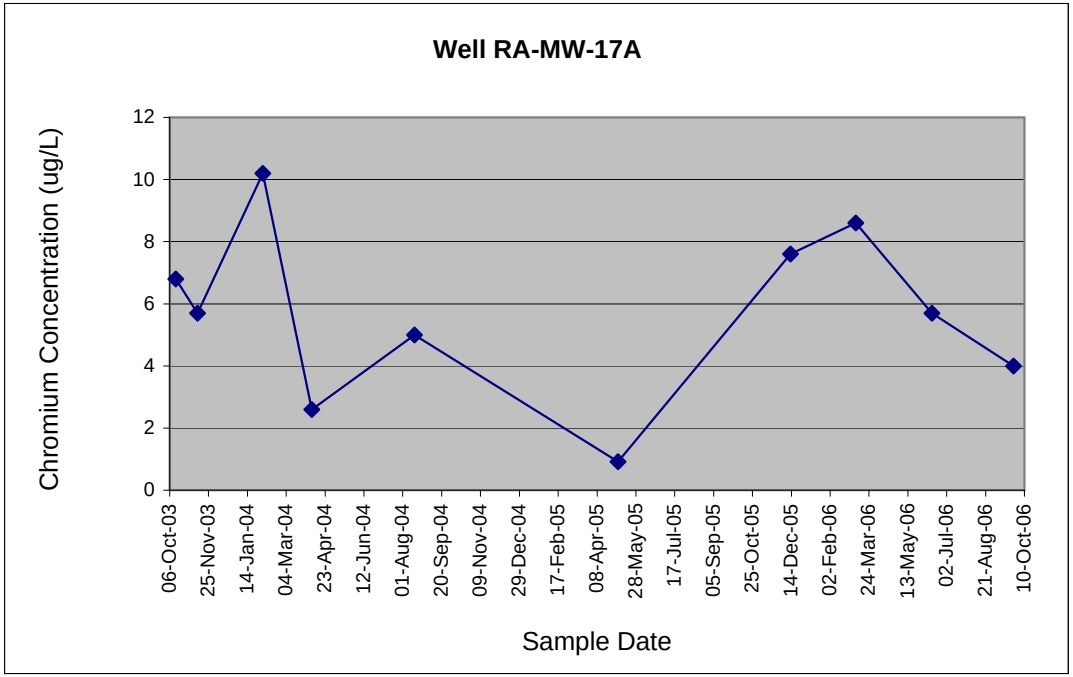
Well RA-MW-13C

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AF9	Water	03-Feb-04	CHROMIUM	3.7	UG/L	J	RA-MW-13C	Total	2
MJ2BH6	Water	6-Apr-04	CHROMIUM	1.4	UG/L	J	RA-MW-13C	Total	0
MJ4721	Water	17-Aug-04	CHROMIUM	0.68	UG/L	J	RA-MW-13C	Total	2
184263	Water	5-May-05	CHROMIUM	7.3	UG/L		RA-MW-13C	Total	9.8
05504287	Water	13-Dec-05	CHROMIUM	1.2	UG/L		RA-MW-13C	Total	0.1
104248	Water	7-Mar-06	CHROMIUM	1.4	UG/L		RA-MW-13C	Total	6
244303	Water	14-Jun-06	CHROMIUM	4.1	UG/L		RA-MW-13C	Total	5
394196	Water	26-Sep-06	CHROMIUM	5.5	UG/L		RA-MW-13C	Total	9.7



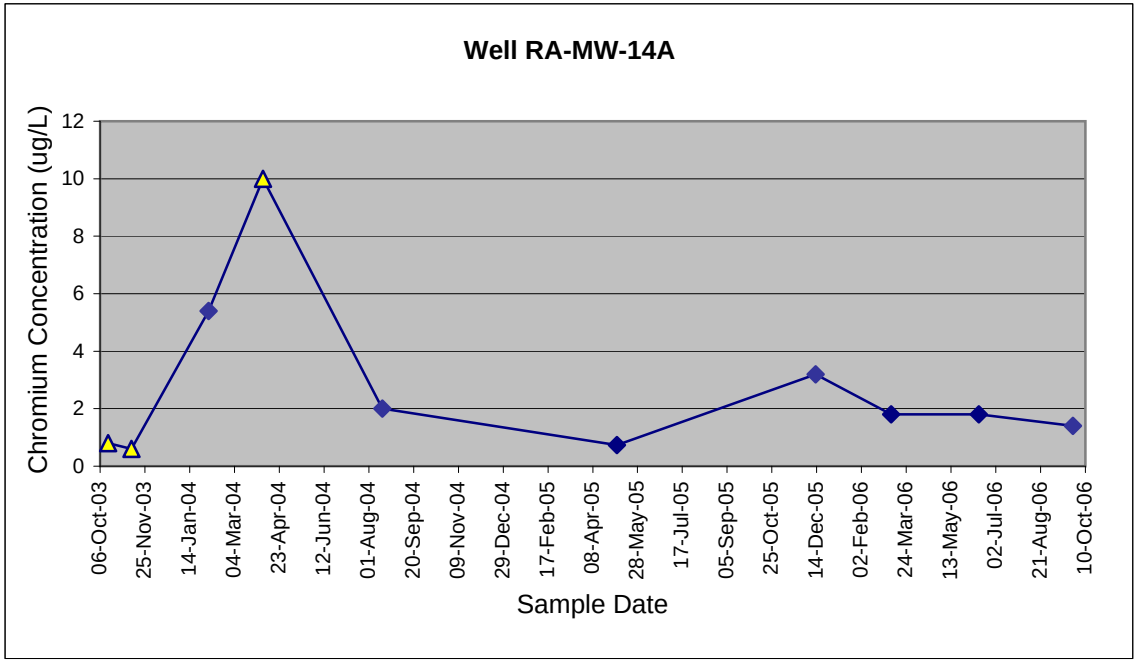
Well RA-MW-17A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2501	Water	14-Oct-03	CHROMIUM	6.8	UG/L	BJ	RA-MW-17A	Total	<10
MJ27E5	Water	11-Nov-03	CHROMIUM	5.7	UG/L	BJ	RA-MW-17A	Total	<10
MJ2AG0	Water	03-Feb-04	CHROMIUM	10.2	UG/L	J	RA-MW-17A	Total	1
MJ2BH7	Water	6-Apr-04	CHROMIUM	2.6	UG/L	J	RA-MW-17A	Total	0
MJ4715	Water	16-Aug-04	CHROMIUM	5	UG/L	J	RA-MW-17A	Total	1
184260	Water	5-May-05	CHROMIUM	0.92	UG/L		RA-MW-17A	Total	10
05504299	Water	13-Dec-05	CHROMIUM	7.6	UG/L		RA-MW-17A	Total	3.1
104240	Water	7-Mar-06	CHROMIUM	8.6	UG/L		RA-MW-17A	Total	7
244293	Water	13-Jun-06	CHROMIUM	5.7	UG/L		RA-MW-17A	Total	1
394193	Water	26-Sep-06	CHROMIUM	4	UG/L		RA-MW-17A	Total	1



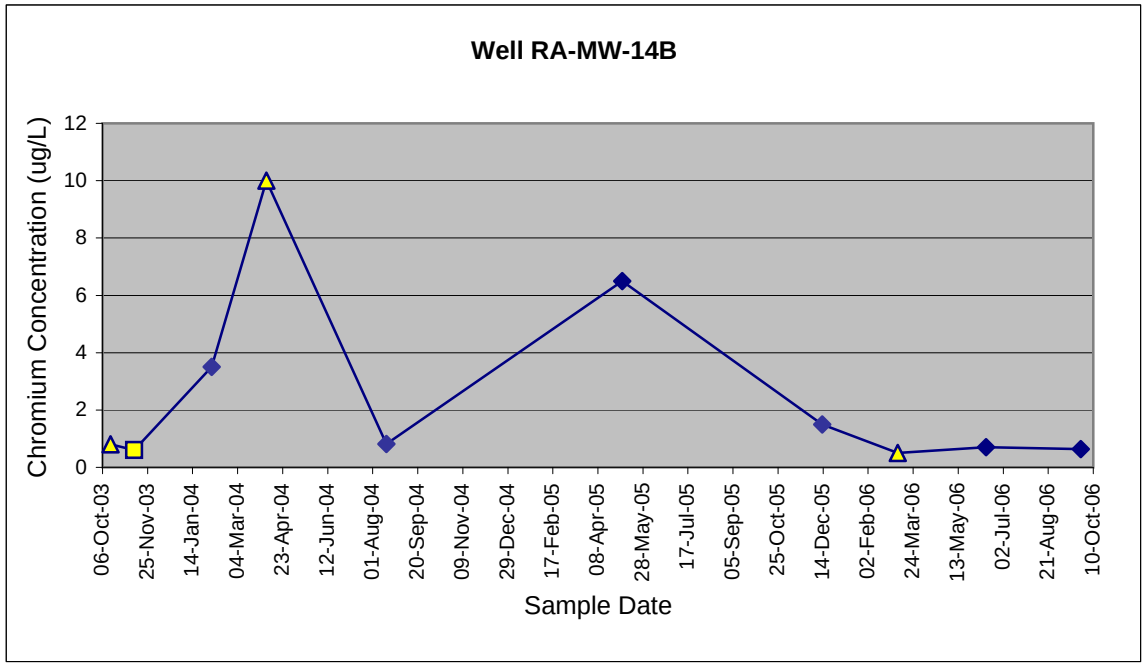
Well RA-MW-14A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2504	Water	15-Oct-03	CHROMIUM	0.8	UG/L	U	RA-MW-14A	Total	<10
MJ27D8	Water	10-Nov-03	CHROMIUM	0.6	UG/L	UJ	RA-MW-14A	Total	<10
MJ2AG2	Water	04-Feb-04	CHROMIUM	5.4	UG/L	J	RA-MW-14A	Total	0
MJ2BG5	Water	5-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-14A	Total	5
MJ4712	Water	16-Aug-04	CHROMIUM	2	UG/L	J	RA-MW-14A	Total	3
184258	Water	5-May-05	CHROMIUM	0.73	UG/L		RA-MW-14A	Total	7.5
05504294	Water	13-Dec-05	CHROMIUM	3.2	UG/L		RA-MW-14A	Total	1.5
104250	Water	7-Mar-06	CHROMIUM	1.8	UG/L		RA-MW-14A	Total	1
244294	Water	13-Jun-06	CHROMIUM	1.8	UG/L		RA-MW-14A	Total	1
394198	Water	26-Sep-06	CHROMIUM	1.4	UG/L		RA-MW-14A	Total	0.3



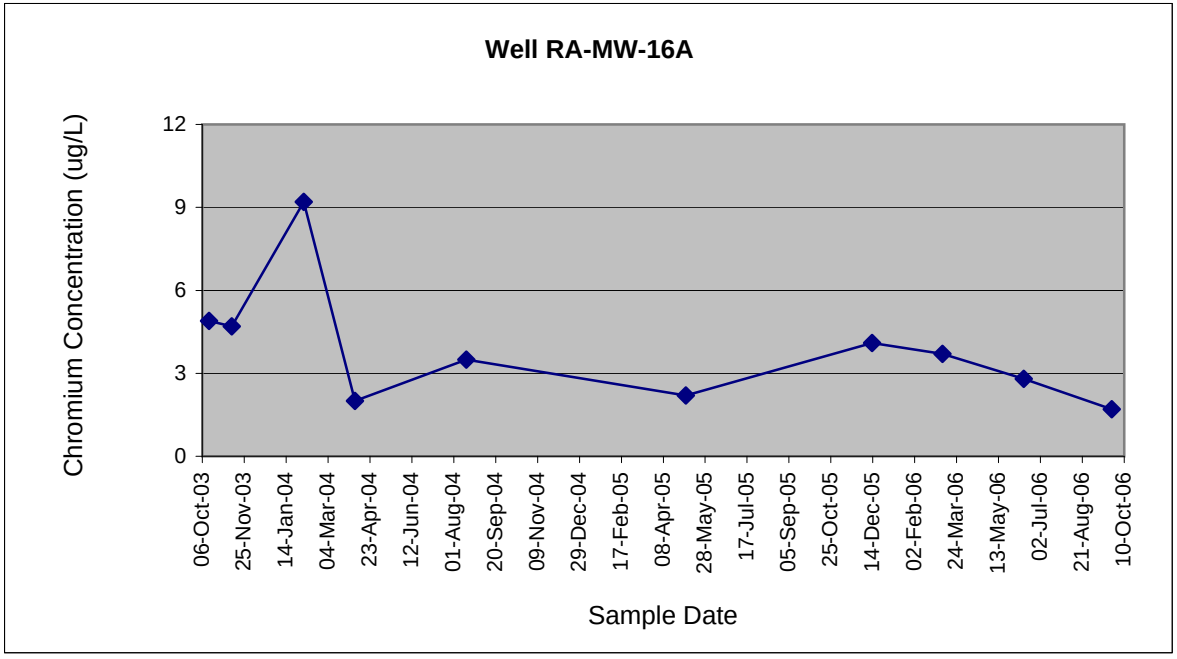
Well RA-MW-14B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2505	Water	15-Oct-03	CHROMIUM	0.8	UG/L	U	RA-MW-14B	Total	<10
MJ27D9	Water	10-Nov-03	CHROMIUM	0.6	UG/L	R	RA-MW-14B	Total	<10
MJ2AG4	Water	04-Feb-04	CHROMIUM	3.5	UG/L	J	RA-MW-14B	Total	1
MJ2BG7	Water	5-Apr-04	CHROMIUM	10	UG/L	U	RA-MW-14B	Total	0
MJ4714	Water	16-Aug-04	CHROMIUM	0.81	UG/L	J	RA-MW-14B	Total	2
184259	Water	5-May-05	CHROMIUM	6.5	UG/L		RA-MW-14B	Total	5.6
05504295	Water	13-Dec-05	CHROMIUM	1.5	UG/L		RA-MW-14B	Total	6.1
104249	Water	7-Mar-06	CHROMIUM	0.5	UG/L	U	RA-MW-14B	Total	4
244295	Water	13-Jun-06	CHROMIUM	0.7	UG/L		RA-MW-14B	Total	9
394199	Water	26-Sep-06	CHROMIUM	0.64	UG/L		RA-MW-14B	Total	2



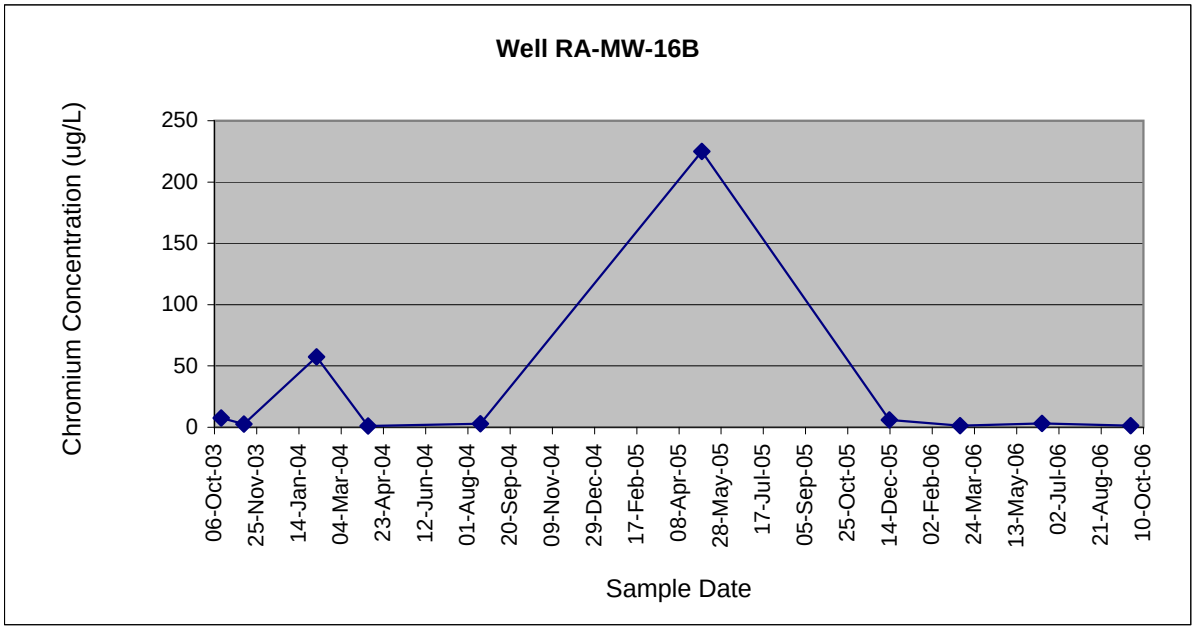
Well RA-MW-16A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2502	Water	14-Oct-03	CHROMIUM	4.9	UG/L	BJ	RA-MW-16A	Total	<10
MJ27E0	Water	10-Nov-03	CHROMIUM	4.7	UG/L	BJ	RA-MW-16A	Total	<10
MJ2AG5	Water	04-Feb-04	CHROMIUM	9.2	UG/L	J	RA-MW-16A	Total	1
MJ2BG8	Water	5-Apr-04	CHROMIUM	2	UG/L	J	RA-MW-16A	Total	1
MJ4716	Water	16-Aug-04	CHROMIUM	3.5	UG/L	J	RA-MW-16A	Total	2
184257	Water	5-May-05	CHROMIUM	2.2	UG/L		RA-MW-16A	Total	8.5
05504293	Water	13-Dec-05	CHROMIUM	4.1	UG/L		RA-MW-16A	Total	1.2
104238	Water	7-Mar-06	CHROMIUM	3.7	UG/L		RA-MW-16A	Total	1.7
244304	Water	12-Jun-06	CHROMIUM	2.8	UG/L		RA-MW-16A	Total	1
394189	Water	25-Sep-06	CHROMIUM	1.7	UG/L		RA-MW-16A	Total	1



Well RA-MW-16B

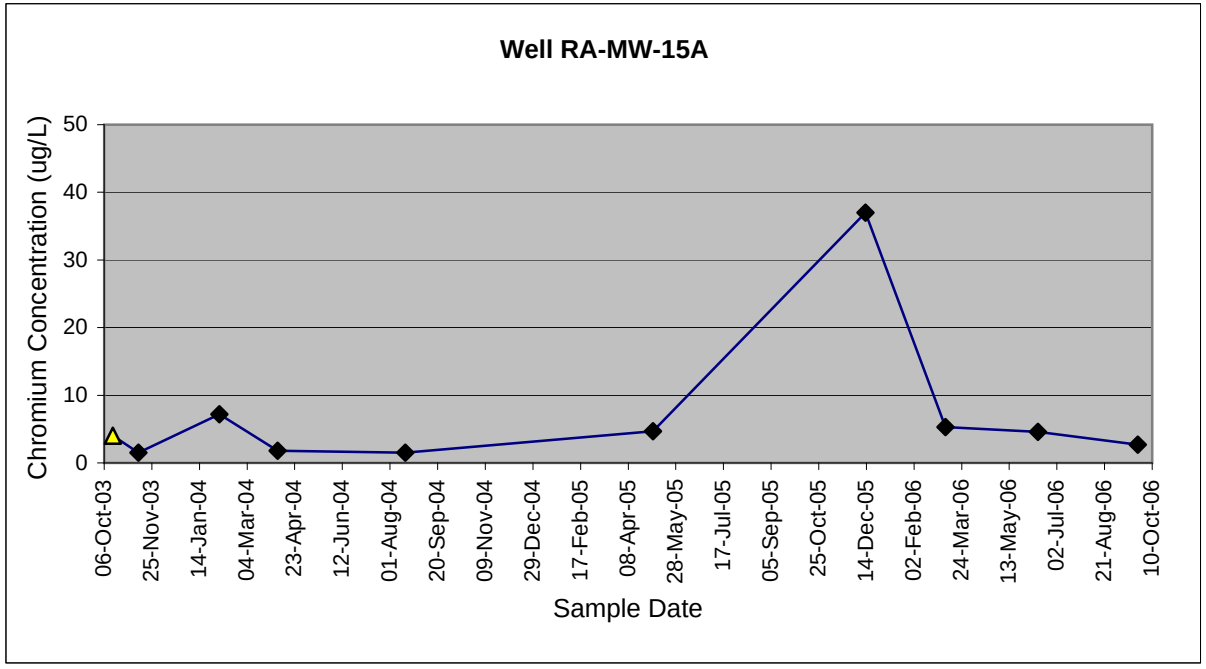
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2503	Water	14-Oct-03	CHROMIUM	7.6	UG/L	BJ	RA-MW-16B	Total	<10
MJ27E1	Water	10-Nov-03	CHROMIUM	2.5	UG/L	BJ	RA-MW-16B	Total	<10
MJ2AG6	Water	04-Feb-04	CHROMIUM	57.4	UG/L	BJ	RA-MW-16B	Total	1
MJ2BH0	Water	5-Apr-04	CHROMIUM	1	UG/L	J	RA-MW-16B	Dissolved	0
MJ4717	Water	16-Aug-04	CHROMIUM	2.8	UG/L	J	RA-MW-16B	Total	3.6
184256	Water	5-May-05	CHROMIUM	225	UG/L		RA-MW-16B	Total	5.7
05504291	Water	13-Dec-05	CHROMIUM	6.1	UG/L		RA-MW-16B	Dissolved	3.9
104239	Water	7-Mar-06	CHROMIUM	1.3	UG/L		RA-MW-16B	Total	0
244305	Water	12-Jun-06	CHROMIUM	3.2	UG/L		RA-MW-16B	Total	0.3
394187	Water	25-Sep-06	CHROMIUM	1.3	UG/L		RA-MW-16B	Dissolved	0.7



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

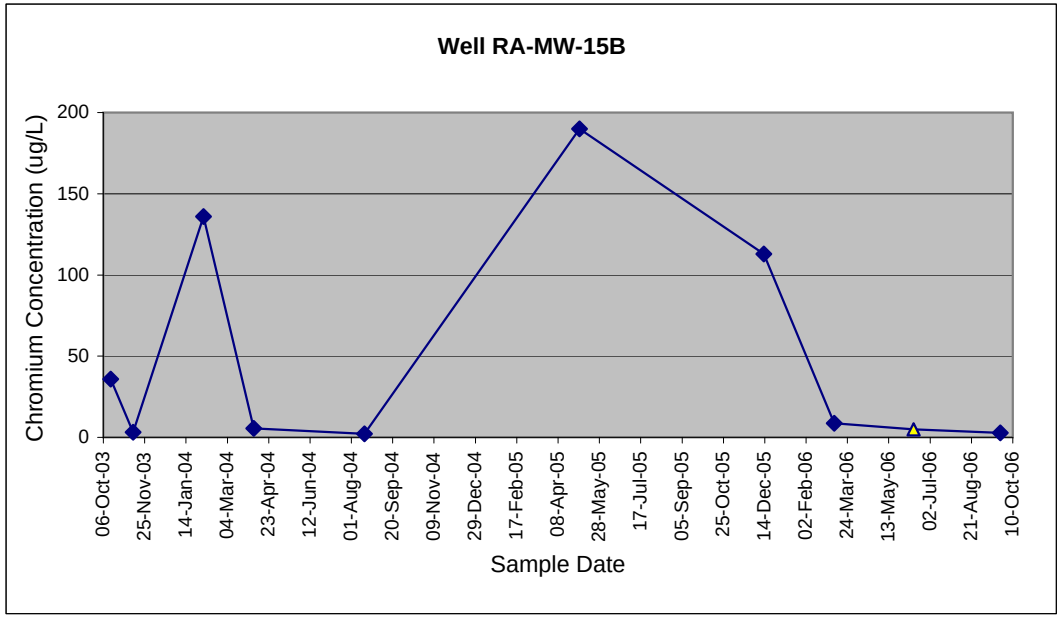
Well RA-MW-15A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2506	Water	15-Oct-03	CHROMIUM	4	UG/L	U	RA-MW-15A	Total	<10
MJ27E8	Water	11-Nov-03	CHROMIUM	1.5	UG/L	BJ	RA-MW-15A	Total	<10
MJ2AG7	Water	04-Feb-04	CHROMIUM	7.2	UG/L	J	RA-MW-15A	Total	1
MJ2BH1	Water	5-Apr-04	CHROMIUM	1.8	UG/L	J	RA-MW-15A	Total	0
MJ4722	Water	17-Aug-04	CHROMIUM	1.5	UG/L	J	RA-MW-15A	Total	0
184248	Water	4-May-05	CHROMIUM	4.7	UG/L		RA-MW-15A	Total	2
05504290	Water	13-Dec-05	CHROMIUM	37	UG/L		RA-MW-15A	Total	1.3
104251	Water	7-Mar-06	CHROMIUM	5.3	UG/L		RA-MW-15A	Total	0
244290	Water	12-Jun-06	CHROMIUM	4.6	UG/L		RA-MW-15A	Total	0.6
394192	Water	25-Sep-06	CHROMIUM	2.7	UG/L		RA-MW-15A	Total	0.2



Well RA-MW-15B

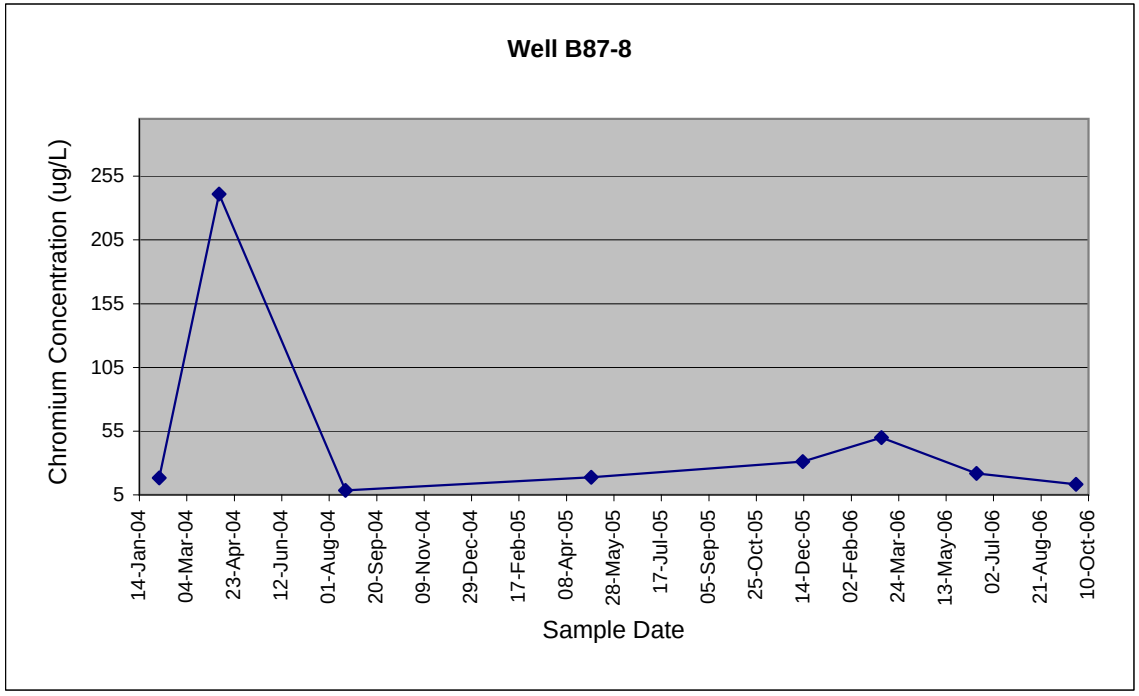
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2507	Water	15-Oct-03	CHROMIUM	35.8	UG/L		RA-MW-15B	Total	<10
MJ27E9	Water	11-Nov-03	CHROMIUM	3.2	UG/L	BJ	RA-MW-15B	Total	<10
MJ2AG8	Water	04-Feb-04	CHROMIUM	136	UG/L		RA-MW-15B	Total	2
MJ2BH2	Water	5-Apr-04	CHROMIUM	5.5	UG/L	J	RA-MW-15B	Total	0
MJ4723	Water	17-Aug-04	CHROMIUM	2.2	UG/L	J	RA-MW-15B	Total	1
184249	Water	4-May-05	CHROMIUM	190	UG/L		RA-MW-15B	Total	9.7
05504288	Water	13-Dec-05	CHROMIUM	113	UG/L		RA-MW-15B	Total	3.5
104252	Water	8-Mar-06	CHROMIUM	8.7	UG/L		RA-MW-15B	Dissolved	5
244292	Water	12-Jun-06	CHROMIUM	5	UG/L	U	RA-MW-15B	Dissolved	4
394190	Water	25-Sep-06	CHROMIUM	2.8	UG/L		RA-MW-15B	Dissolved	4



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

Well B87-8

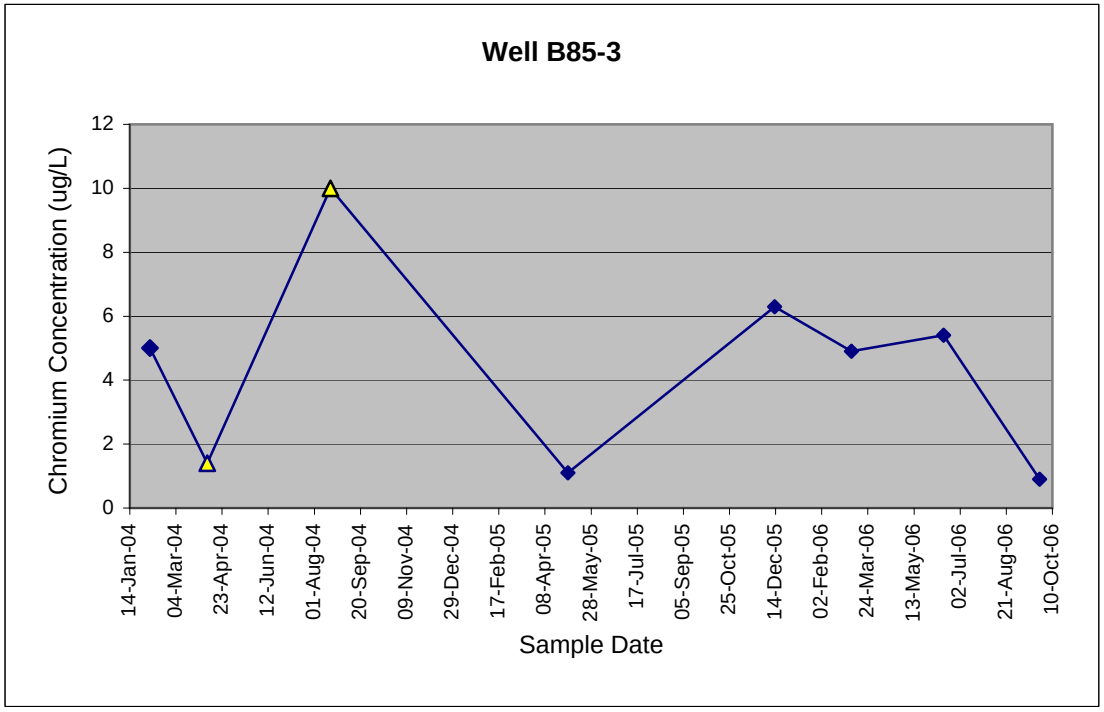
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AG9	Water	04-Feb-04	CHROMIUM	18.2	UG/L		B87-8	Total	2
MJ2BK0	Water	7-Apr-04	CHROMIUM	241	UG/L		B87-8	Total	8
MJ4737	Water	18-Aug-04	CHROMIUM	8.5	UG/L	J	B87-8	Dissolved	36
184247	Water	4-May-05	CHROMIUM	18.8	UG/L		B87-8	Total	6.5
05504297	Water	13-Dec-05	CHROMIUM	31	UG/L		B87-8	Total	5.1
104236	Water	6-Mar-06	CHROMIUM	50	UG/L		B87-8	Total	8
244308	Water	14-Jun-06	CHROMIUM	21.8	UG/L		B87-8	Total	3
394204	Water	27-Sep-06	CHROMIUM	13.4	UG/L		B87-8	Dissolved	13



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

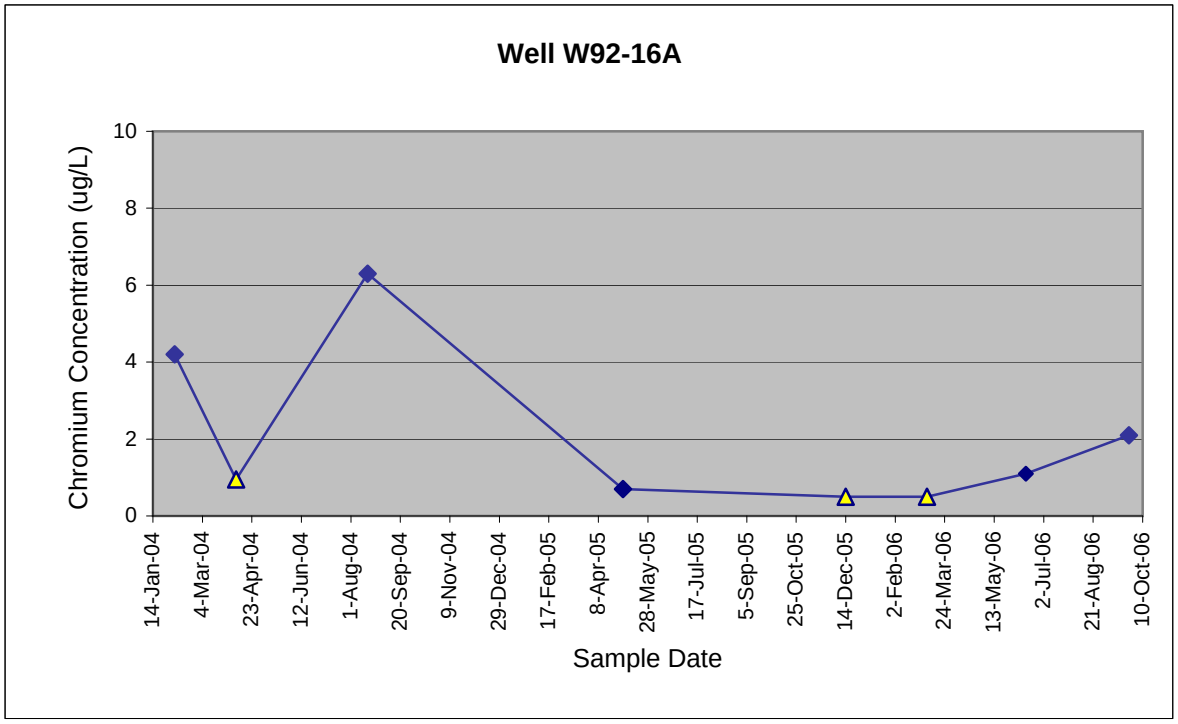
Well B85-3

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH0	Water	05-Feb-04	CHROMIUM	5	UG/L	J	B85-3	Total	1
MJ2BJ6	Water	7-Apr-04	CHROMIUM	1.4	UG/L	U	B85-3	Total	3
MJ4732	Water	18-Aug-04	CHROMIUM	10	UG/L	U	B85-3	Total	0
184232	Water	3-May-05	CHROMIUM	1.1	UG/L		B85-3	Total	2.8
05504298	Water	13-Dec-05	CHROMIUM	6.3	UG/L		B85-3	Total	8.1
104235	Water	6-Mar-06	CHROMIUM	4.9	UG/L		B85-3	Total	7
244311	Water	14-Jun-06	CHROMIUM	5.4	UG/L		B85-3	Total	6
394197	Water	26-Sep-06	CHROMIUM	0.9	UG/L		B85-3	Total	1



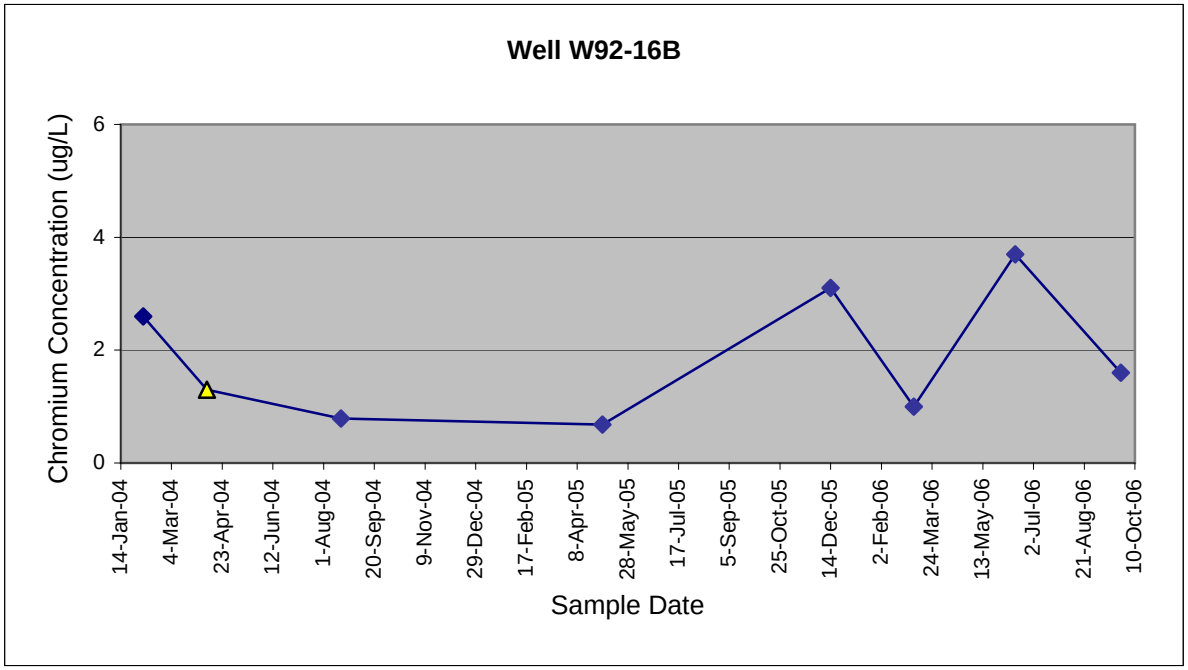
Well W92-16A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH1	Water	05-Feb-04	CHROMIUM	4.2	UG/L	J	W92-16A	Total	2
MJ2BJ7	Water	7-Apr-04	CHROMIUM	0.95	UG/L	U	W92-16A	Total	0
MJ4734	Water	18-Aug-04	CHROMIUM	6.3	UG/L	J	W92-16A	Total	0
184234	Water	3-May-05	CHROMIUM	0.7	UG/L		W92-16A	Total	0.7
05504311	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W92-16A	Total	0.7
104234	Water	6-Mar-06	CHROMIUM	0.5	UG/L	U	W92-16A	Total	0.7
244304	Water	14-Jun-06	CHROMIUM	1.1	UG/L		W92-16A	Total	2
394200	Water	26-Sep-06	CHROMIUM	2.1	UG/L		W92-16A	Total	4



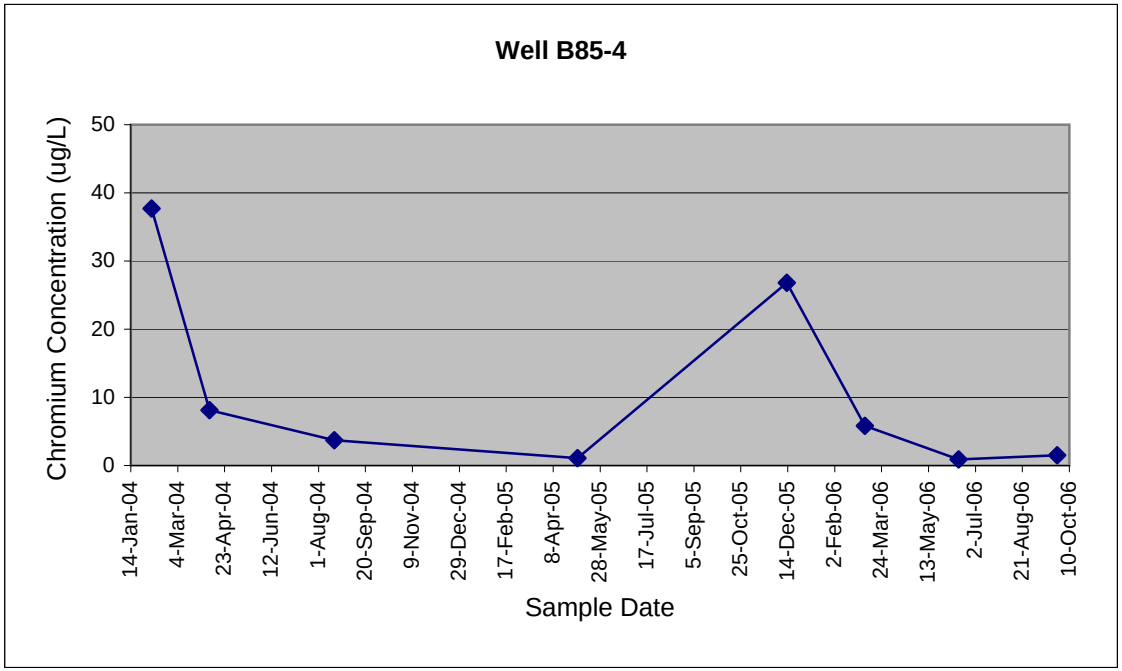
Well W92-16B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH3	Water	05-Feb-04	CHROMIUM	2.6	UG/L	J	W92-16B	Total	7
MJ2BJ8	Water	7-Apr-04	CHROMIUM	1.3	UG/L	U	W92-16B	Total	2
MJ4735	Water	18-Aug-04	CHROMIUM	0.79	UG/L	J	W92-16B	Total	<10
184233	Water	3-May-05	CHROMIUM	0.68	UG/L		W92-16B	Total	3.9
05504312	Water	14-Dec-05	CHROMIUM	3.1	UG/L		W92-16B	Total	5.1
104233	Water	6-Mar-06	CHROMIUM	1	UG/L		W92-16B	Total	8.7
244305	Water	14-Jun-06	CHROMIUM	3.7	UG/L		W92-16B	Total	7
394201	Water	26-Sep-06	CHROMIUM	1.6	UG/L		W92-16B	Total	0.7



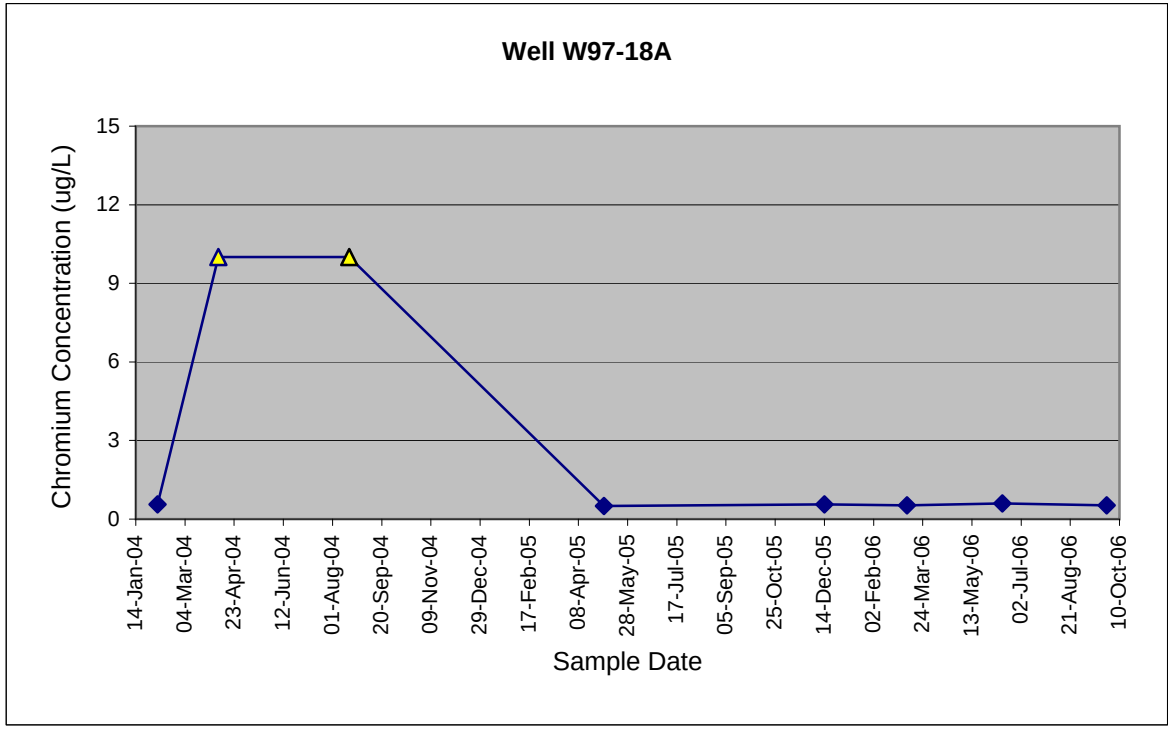
Well B85-4

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH4	Water	05-Feb-04	CHROMIUM	37.7	UG/L		B85-4	Total	1
MJ2BK1	Water	7-Apr-04	CHROMIUM	8.1	UG/L	J	B85-4	Total	0
MJ4738	Water	18-Aug-04	CHROMIUM	3.7	UG/L	J	B85-4	Total	4
184246	Water	4-May-05	CHROMIUM	1.1	UG/L		B85-4	Total	2
05504296	Water	13-Dec-05	CHROMIUM	26.8	UG/L		B85-4	Total	5.7
104237	Water	6-Mar-06	CHROMIUM	5.8	UG/L		B85-4	Total	3.9
244310	Water	14-Jun-06	CHROMIUM	0.9	UG/L		B85-4	Total	0.3
394207	Water	27-Sep-06	CHROMIUM	1.5	UG/L		B85-4	Total	1



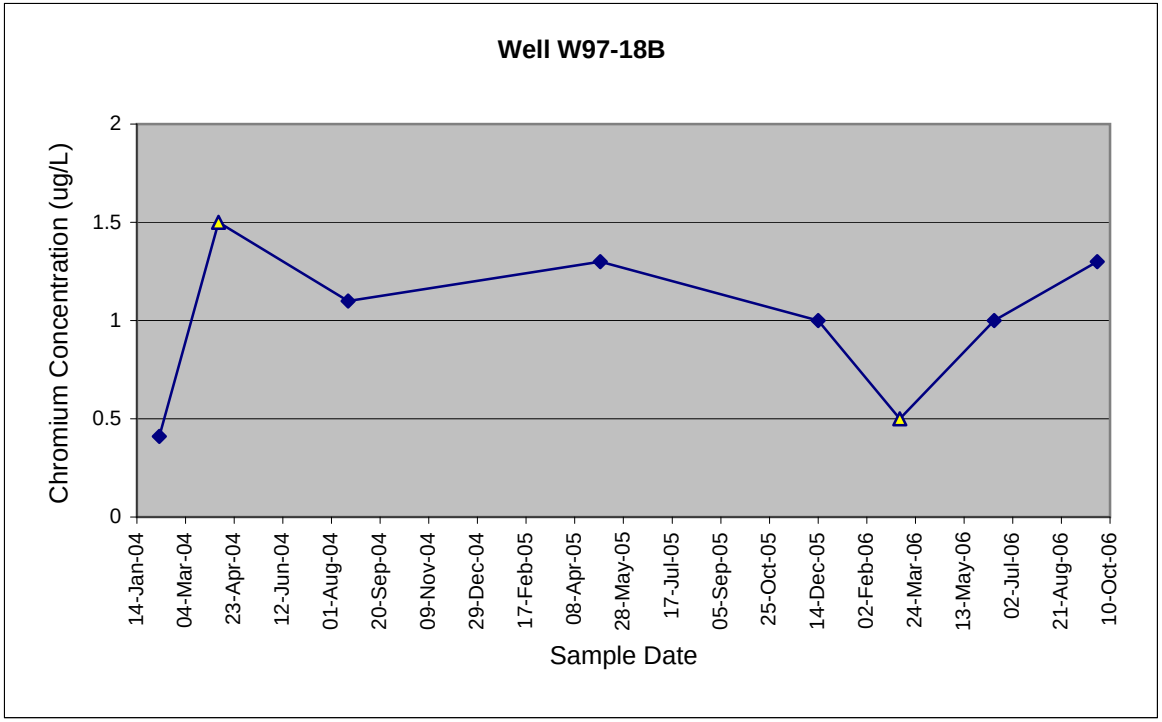
Well W97-18A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH5	Water	05-Feb-04	CHROMIUM	0.56	UG/L	J	W97-18A	Total	14
MJ2BK2	Water	7-Apr-04	CHROMIUM	10	UG/L	U	W97-18A	Total	0
MJ4739	Water	18-Aug-04	CHROMIUM	10	UG/L	U	W97-18A	Total	5
184244	Water	4-May-05	CHROMIUM	0.5	UG/L		W97-18A	Total	1
05504300	Water	14-Dec-05	CHROMIUM	0.56	UG/L		W97-18A	Total	4
104256	Water	8-Mar-06	CHROMIUM	0.53	UG/L		W97-18A	Total	0
244298	Water	13-Jun-06	CHROMIUM	0.6	UG/L		W97-18A	Total	9
394209	Water	27-Sep-06	CHROMIUM	0.53	UG/L		W97-18A	Total	6



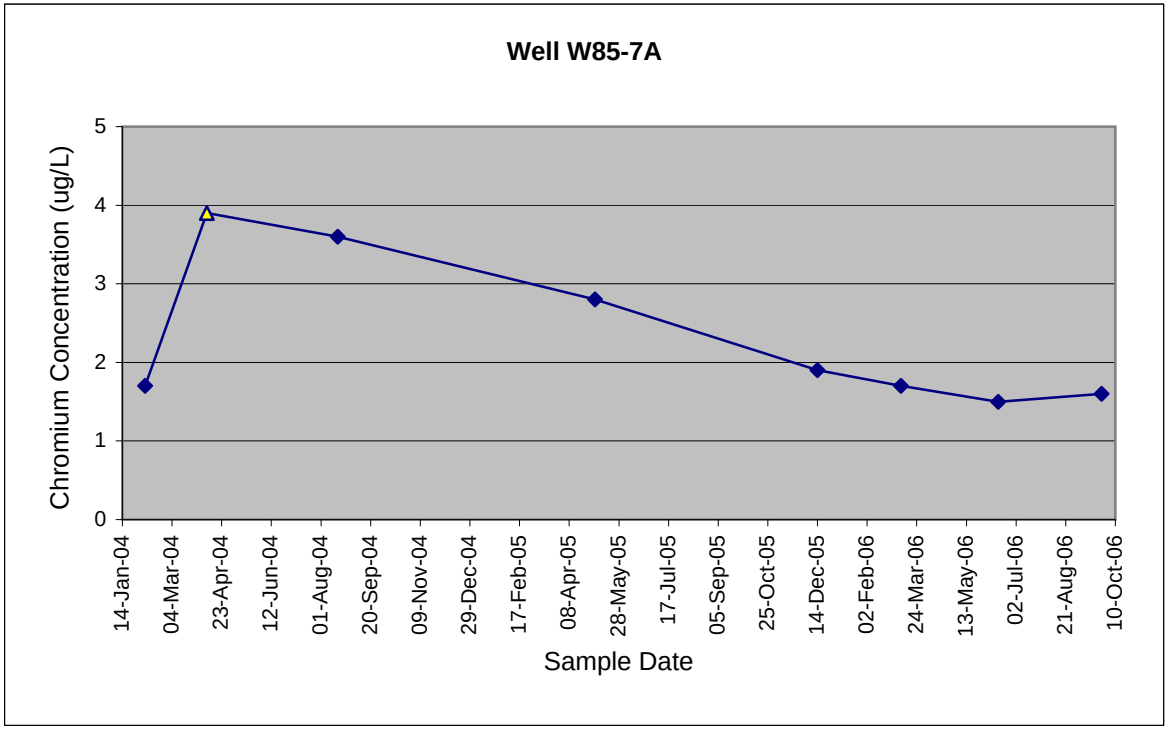
Well W97-18B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH7	Water	06-Feb-04	CHROMIUM	0.41	UG/L	J	W97-18B	Total	2
MJ2BK3	Water	7-Apr-04	CHROMIUM	1.5	UG/L	U	W97-18B	Total	0
MJ4740	Water	18-Aug-04	CHROMIUM	1.1	UG/L	J	W97-18B	Total	5
184245	Water	4-May-05	CHROMIUM	1.3	UG/L		W97-18B	Total	1.1
05504301	Water	14-Dec-05	CHROMIUM	1	UG/L		W97-18B	Total	1.1
104257	Water	8-Mar-06	CHROMIUM	0.5	UG/L	U	W97-18B	Total	1.4
244299	Water	13-Jun-06	CHROMIUM	1	UG/L		W97-18B	Total	6
394208	Water	27-Sep-06	CHROMIUM	1.3	UG/L		W97-18B	Total	3



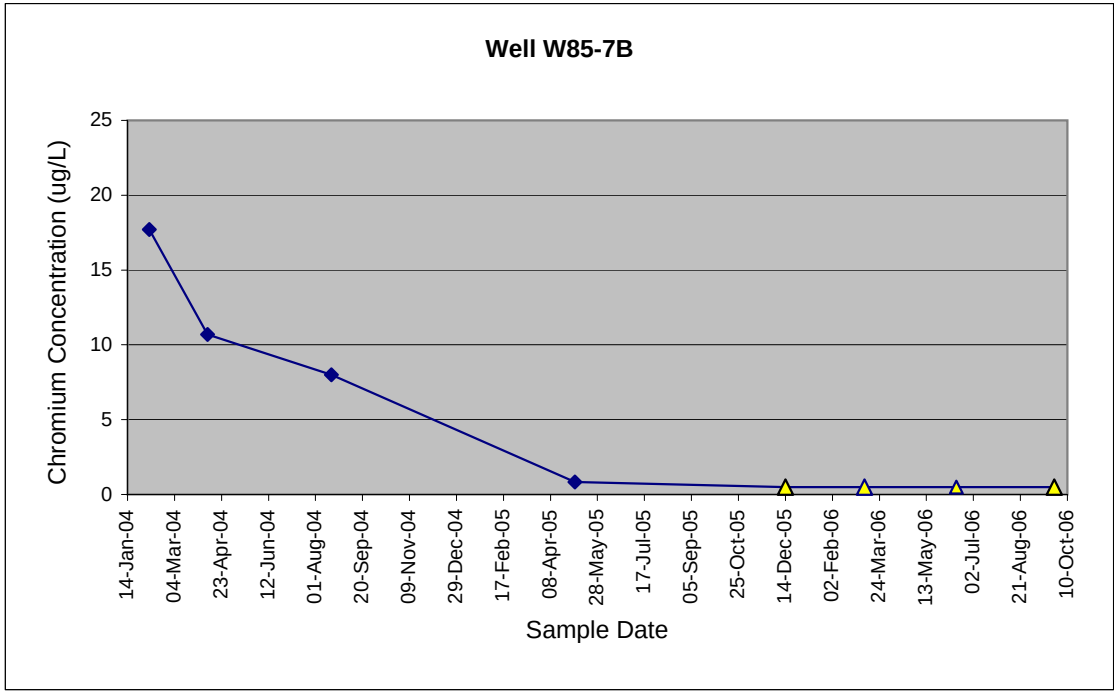
Well W85-7A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH8	Water	06-Feb-04	CHROMIUM	1.7	UG/L	J	W85-7A	Total	1
MJ2BK6	Water	8-Apr-04	CHROMIUM	3.9	UG/L	U	W85-7A	Total	0
MJ4741	Water	18-Aug-04	CHROMIUM	3.6	UG/L	J	W85-7A	Total	3
184239	Water	4-May-05	CHROMIUM	2.8	UG/L		W85-7A	Total	0.5
05504307	Water	14-Dec-05	CHROMIUM	1.9	UG/L		W85-7A	Total	0.2
104254	Water	8-Mar-06	CHROMIUM	1.7	UG/L		W85-7A	Total	0
244306	Water	14-Jun-06	CHROMIUM	1.5	UG/L		W85-7A	Total	0.2
394202	Water	26-Sep-06	CHROMIUM	1.6	UG/L		W85-7A	Total	0.1



Well W85-7B

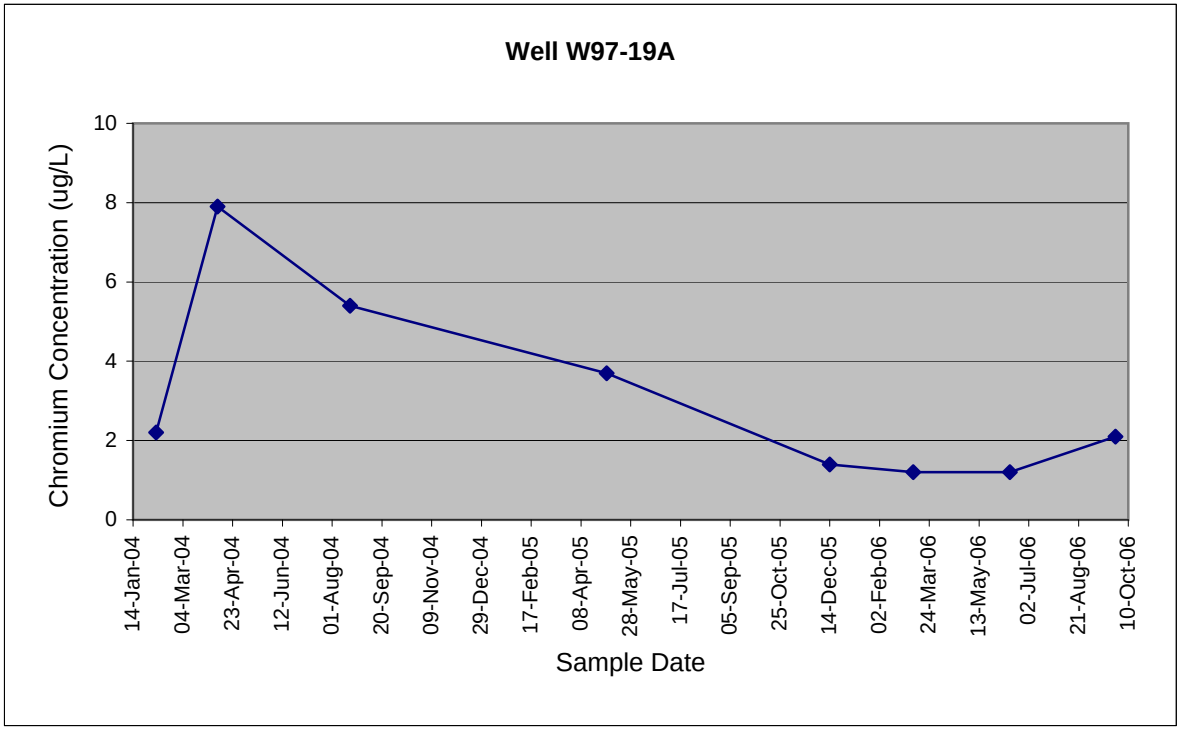
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AH9	Water	06-Feb-04	CHROMIUM	17.7	UG/L		W85-7B	Total	3
MJ2BK7	Water	8-Apr-04	CHROMIUM	10.7	UG/L		W85-7B	Total	0
MJ4742	Water	18-Aug-04	CHROMIUM	8	UG/L	J	W85-7B	Total	25
184240	Water	4-May-05	CHROMIUM	0.84	UG/L		W85-7B	Total	6.7
05504308	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W85-7B	Total	1.4
104255	Water	8-Mar-06	CHROMIUM	0.5	UG/L	U	W85-7B	Total	0
244307	Water	14-Jun-06	CHROMIUM	0.5	UG/L	U	W85-7B	Total	0.7
394203	Water	26-Sep-06	CHROMIUM	0.5	UG/L	U	W85-7B	Total	0.8



Note: Although turbidity was greater than 10 NTU, no filtered sample was collected.

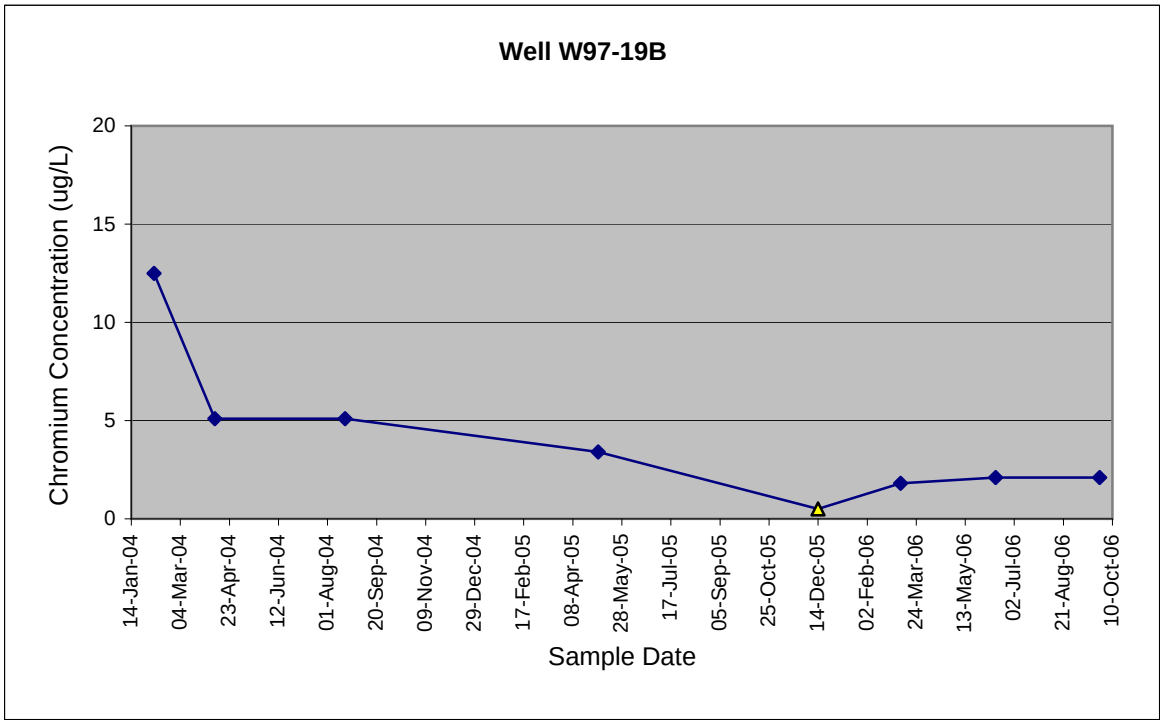
Well W97-19A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ0	Water	06-Feb-04	CHROMIUM	2.2	UG/L	J	W97-19A	Total	7
MJ2BK4	Water	8-Apr-04	CHROMIUM	7.9	UG/L	J	W97-19A	Total	2
MJ4749	Water	19-Aug-04	CHROMIUM	5.4	UG/L	J	W97-19A	Total	8
184242	Water	4-May-05	CHROMIUM	3.7	UG/L		W97-19A	Total	1.8
05504303	Water	14-Dec-05	CHROMIUM	1.4	UG/L		W97-19A	Total	0
104259	Water	8-Mar-06	CHROMIUM	1.2	UG/L		W97-19A	Total	1
244296	Water	13-Jun-06	CHROMIUM	1.2	UG/L		W97-19A	Total	1
394211	Water	27-Sep-06	CHROMIUM	2.1	UG/L		W97-19A	Total	0.4



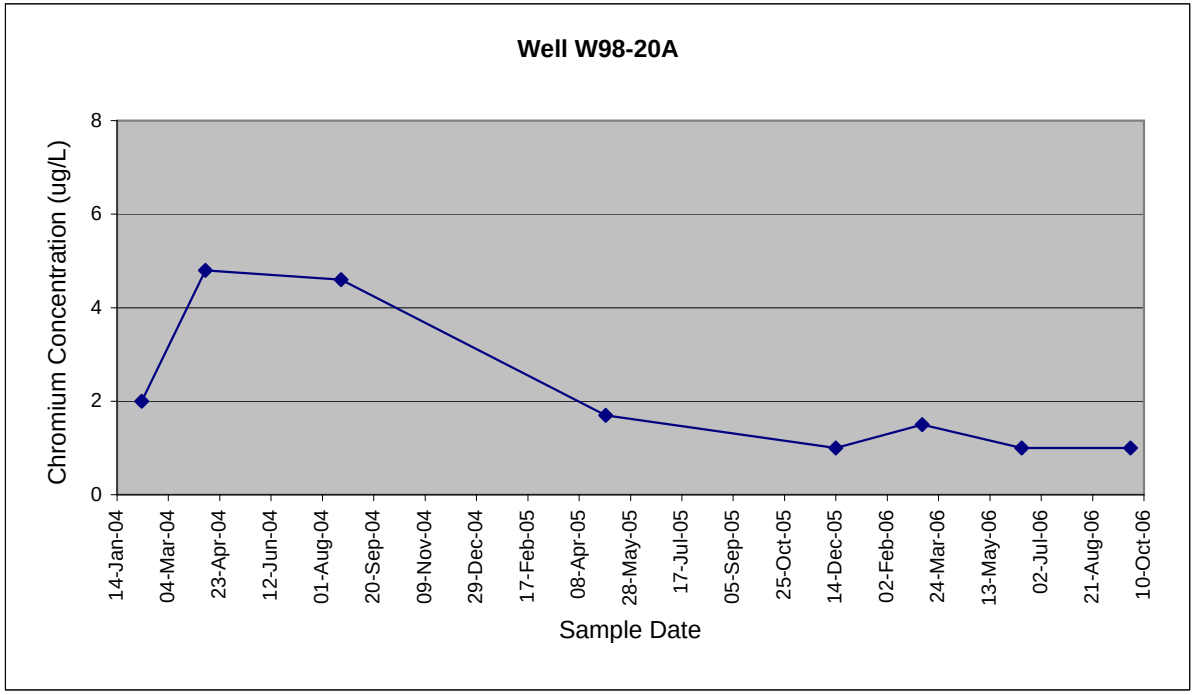
Well W97-19B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ1	Water	06-Feb-04	CHROMIUM	12.5	UG/L	J	W97-19B	Total	0
MJ2BK5	Water	8-Apr-04	CHROMIUM	5.1	UG/L	J	W97-19B	Total	1
MJ4750	Water	19-Aug-04	CHROMIUM	5.1	UG/L	J	W97-19B	Total	3
184243	Water	4-May-05	CHROMIUM	3.4	UG/L		W97-19B	Total	1
05504304	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W97-19B	Total	0
104260	Water	8-Mar-06	CHROMIUM	1.8	UG/L		W97-19B	Total	5
244297	Water	13-Jun-06	CHROMIUM	2.1	UG/L		W97-19B	Total	0.5
394212	Water	27-Sep-06	CHROMIUM	2.1	UG/L		W97-19B	Total	1



Well W98-20A

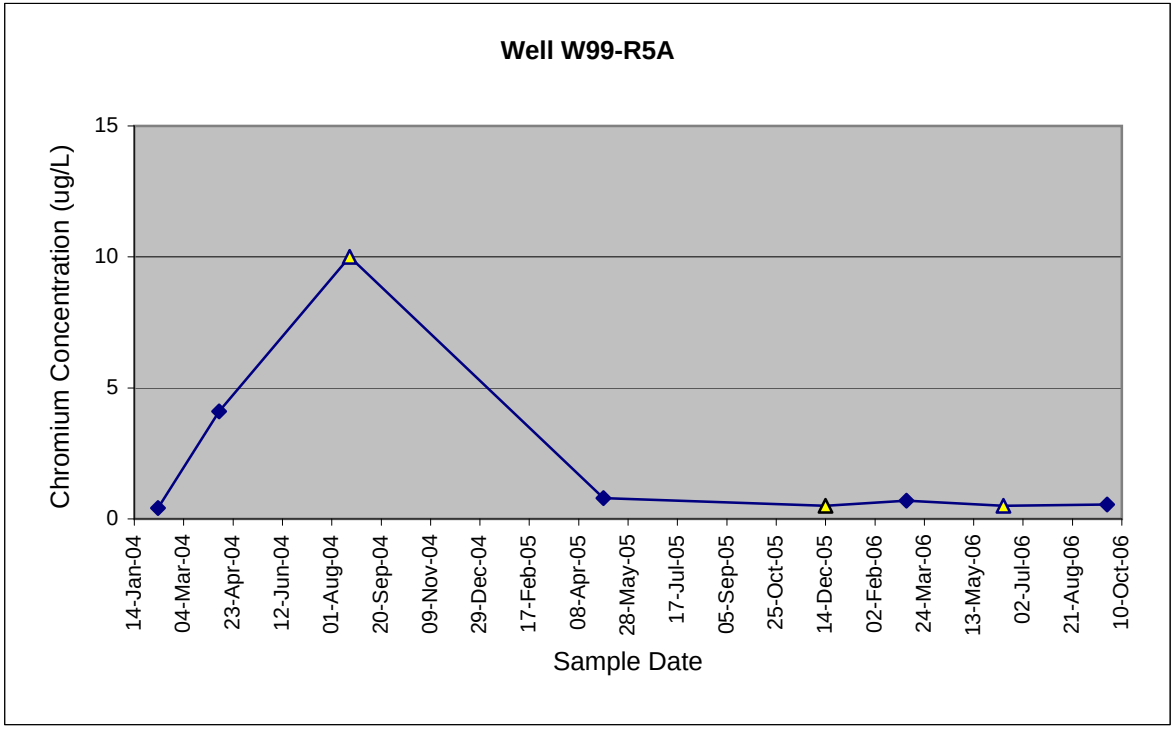
Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ2	Water	07-Feb-04	CHROMIUM	2	UG/L	J	W98-20A	Total	1
MJ2BL2	Water	9-Apr-04	CHROMIUM	4.8	UG/L	J	W98-20A	Total	0
MJ4752	Water	19-Aug-04	CHROMIUM	4.6	UG/L	J	W98-20A	Dissolved	20
184241	Water	4-May-05	CHROMIUM	1.7	UG/L		W98-20A	Total	0.5
05504302	Water	14-Dec-05	CHROMIUM	1	UG/L		W98-20A	Total	0
104258	Water	8-Mar-06	CHROMIUM	1.5	UG/L		W98-20A	Total	0
244300	Water	13-Jun-06	CHROMIUM	1	UG/L		W98-20A	Total	0.4
394210	Water	27-Sep-06	CHROMIUM	1	UG/L		W98-20A	Total	0.1



Note: Where a dissolved concentration is used, the NTU value listed is the pre-filtering value.

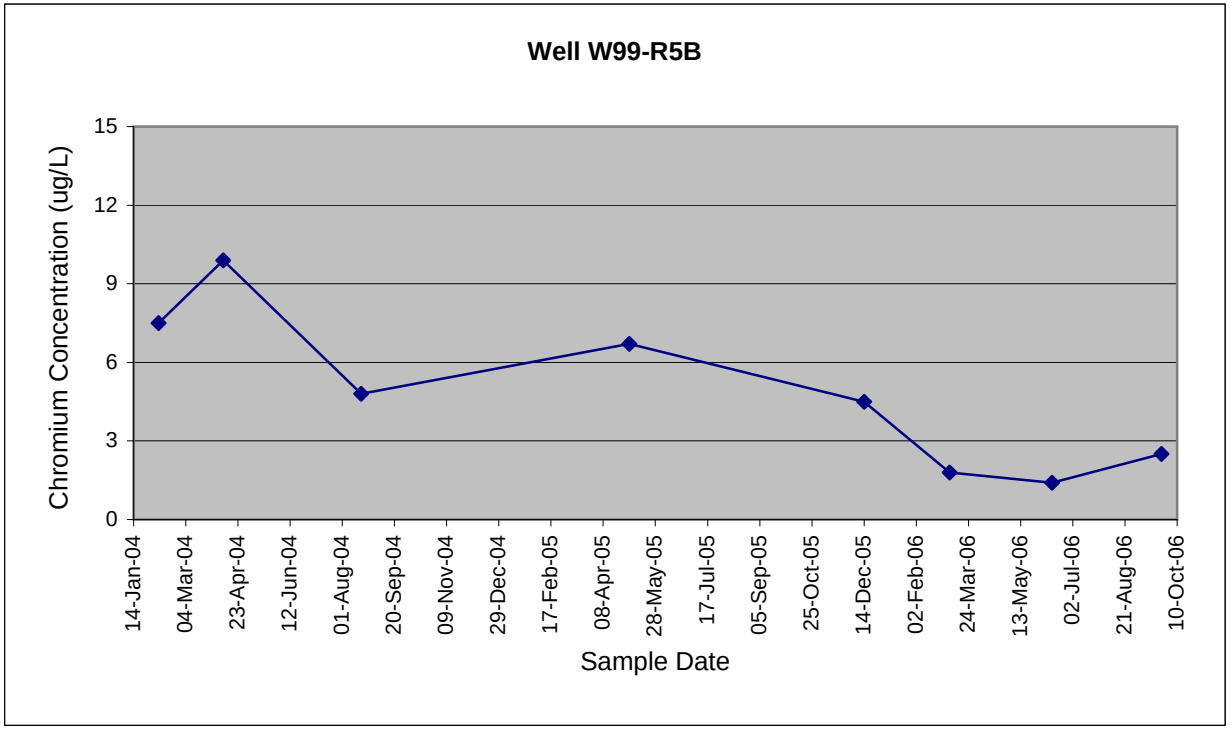
Well W99-R5A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ3	Water	07-Feb-04	CHROMIUM	0.41	UG/L	J	W99-R5A	Total	0
MJ2BL3	Water	9-Apr-04	CHROMIUM	4.1	UG/L	J	W99-R5A	Total	0
MJ4745	Water	19-Aug-04	CHROMIUM	10	UG/L	U	W99-R5A	Total	10
184230	Water	3-May-05	CHROMIUM	0.79	UG/L		W99-R5A	Total	1
05504305	Water	14-Dec-05	CHROMIUM	0.5	UG/L	U	W99-R5A	Total	0
104230	Water	6-Mar-06	CHROMIUM	0.7	UG/L		W99-R5A	Total	0
244280	Water	12-Jun-06	CHROMIUM	0.5	UG/L	U	W99-R5A	Total	1
394180	Water	25-Sep-06	CHROMIUM	0.55	UG/L		W99-R5A	Total	1



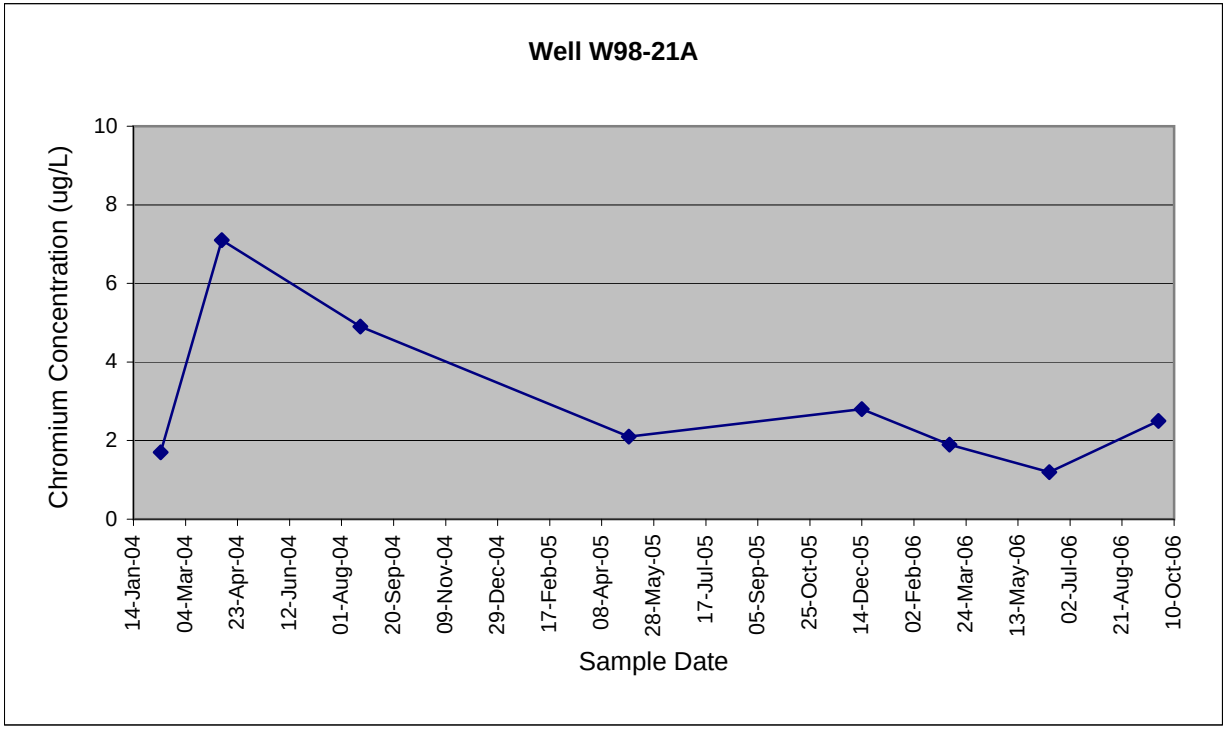
Well W99-R5B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ5	Water	07-Feb-04	CHROMIUM	7.5	UG/L	J	W99-R5B	Total	0
MJ2BL4	Water	9-Apr-04	CHROMIUM	9.9	UG/L	J	W99-R5B	Total	0
MJ4746	Water	19-Aug-04	CHROMIUM	4.8	UG/L	J	W99-R5B	Total	8
184231	Water	3-May-05	CHROMIUM	6.7	UG/L		W99-R5B	Total	2.3
05504306	Water	14-Dec-05	CHROMIUM	4.5	UG/L		W99-R5B	Total	2.1
104231	Water	6-Mar-06	CHROMIUM	1.8	UG/L		W99-R5B	Total	0
244281	Water	12-Jun-06	CHROMIUM	1.4	UG/L		W99-R5B	Total	3
394181	Water	25-Sep-06	CHROMIUM	2.5	UG/L		W99-R5B	Total	1



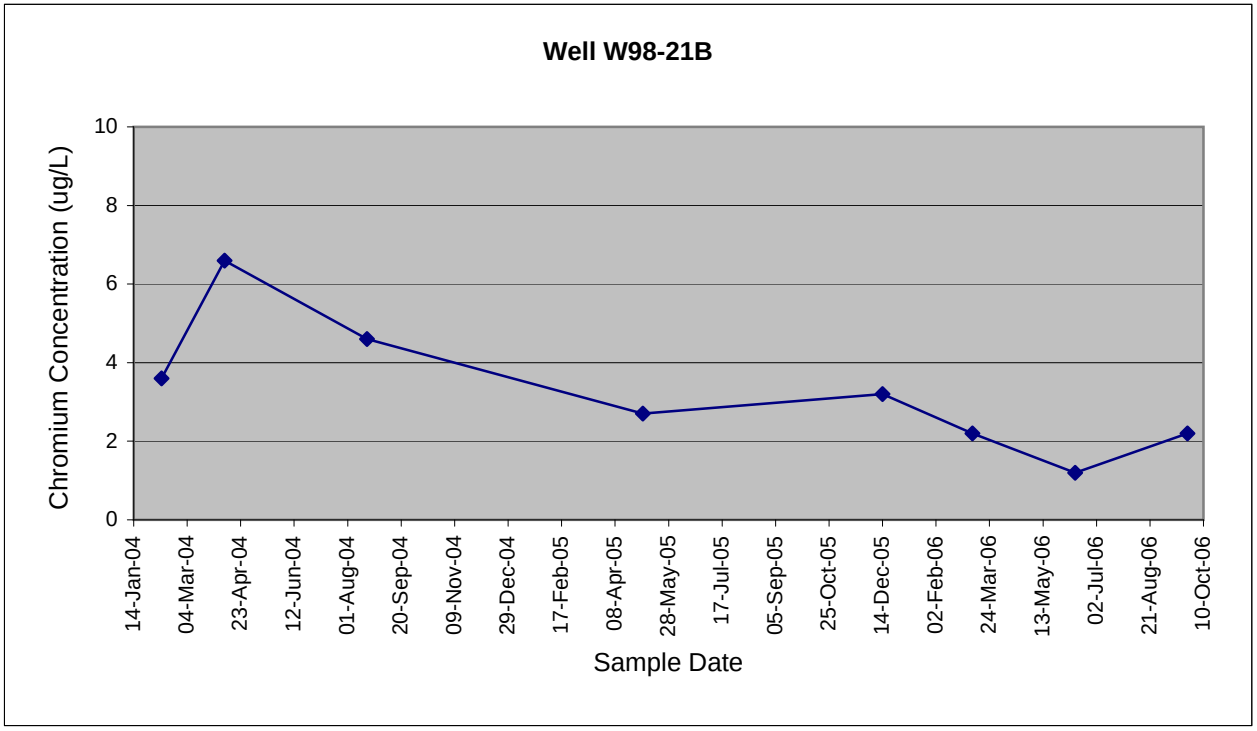
Well W98-21A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ6	Water	09-Feb-04	CHROMIUM	1.7	UG/L	J	W98-21A	Total	No Data
MJ2BK8	Water	8-Apr-04	CHROMIUM	7.1	UG/L	J	W98-21A	Total	0
MJ4743	Water	19-Aug-04	CHROMIUM	4.9	UG/L	J	W98-21A	Total	0
184237	Water	4-May-05	CHROMIUM	2.1	UG/L		W98-21A	Total	1.3
05504309	Water	14-Dec-05	CHROMIUM	2.8	UG/L		W98-21A	Total	0.1
104261	Water	8-Mar-06	CHROMIUM	1.9	UG/L		W98-21A	Total	0
244282	Water	12-Jun-06	CHROMIUM	1.2	UG/L		W98-21A	Total	0.3
394185	Water	25-Sep-06	CHROMIUM	2.5	UG/L		W98-21A	Total	0.2



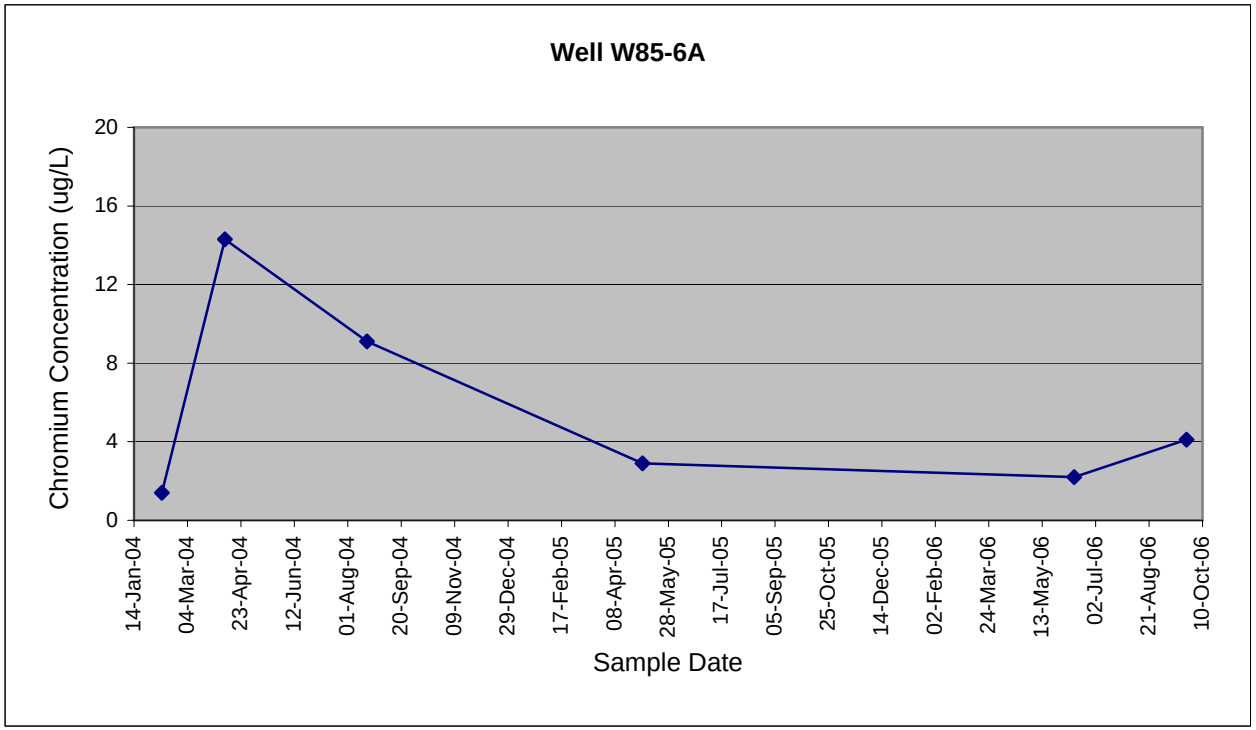
Well W98-21B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ7	Water	09-Feb-04	CHROMIUM	3.6	UG/L	J	W98-21B	Total	No Data
MJ2BK9	Water	8-Apr-04	CHROMIUM	6.6	UG/L	J	W98-21B	Total	0
MJ4744	Water	19-Aug-04	CHROMIUM	4.6	UG/L	J	W98-21B	Total	5
184238	Water	4-May-05	CHROMIUM	2.7	UG/L		W98-21B	Total	0.5
05504310	Water	14-Dec-05	CHROMIUM	3.2	UG/L		W98-21B	Total	0
104262	Water	8-Mar-06	CHROMIUM	2.2	UG/L		W98-21B	Total	0
244283	Water	12-Jun-06	CHROMIUM	1.2	UG/L		W98-21B	Total	0.3
394186	Water	25-Sep-06	CHROMIUM	2.2	UG/L		W98-21B	Total	0.1



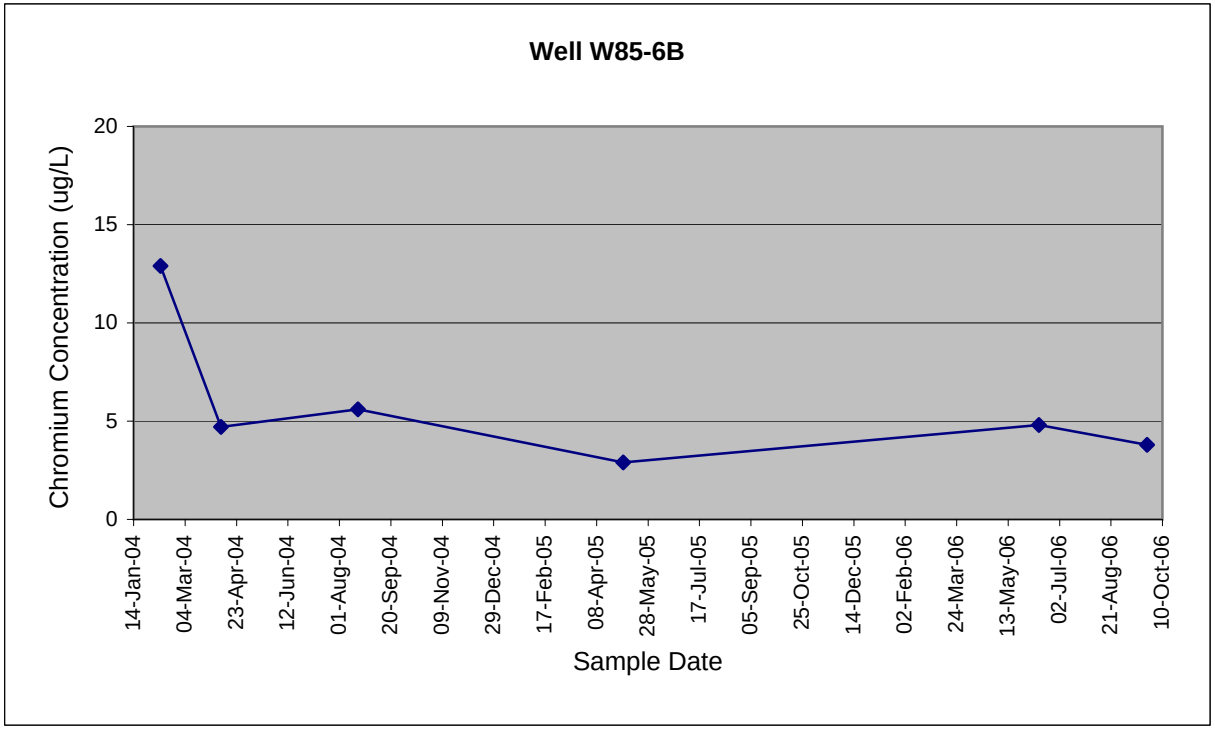
Well W85-6A

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ8	Water	09-Feb-04	CHROMIUM	1.4	UG/L	J	W85-6A	Total	No Data
MJ2BL0	Water	8-Apr-04	CHROMIUM	14.3	UG/L		W85-6A	Total	0
MJ4747	Water	19-Aug-04	CHROMIUM	9.1	UG/L	J	W85-6A	Total	<10
184235	Water	4-May-05	CHROMIUM	2.9	UG/L		W85-6A	Total	1
244284	Water	12-Jun-06	CHROMIUM	2.2	UG/L		W85-6A	Total	0.7
394182	Water	25-Sep-06	CHROMIUM	4.1	UG/L		W85-6A	Total	0.1



Well W85-6B

Sample No.	Matrix	Sample Date	Analyte	Conc.	Units	Qualifier	Station Location	Notes	NTU
MJ2AJ9	Water	09-Feb-04	CHROMIUM	12.9	UG/L		W85-6B	Total	No Data
MJ2BL1	Water	8-Apr-04	CHROMIUM	4.7	UG/L	J	W85-6B	Total	0
MJ4748	Water	19-Aug-04	CHROMIUM	5.6	UG/L	J	W85-6B	Total	5
184236	Water	4-May-05	CHROMIUM	2.9	UG/L		W85-6B	Total	1
244286	Water	12-Jun-06	CHROMIUM	4.8	UG/L		W85-6B	Total	49
394183	Water	25-Sep-06	CHROMIUM	3.8	UG/L		W85-6B	Total	14



APPENDIX B

LABORATORY DATA SHEETS

Manchester Environmental Laboratory

7411 Beach Dr E, Port Orchard, Washington 98366

Case Narrative

October 17, 2006

Subject: Metals Frontier Hardchrome 39

Project No: 174506

Officer: Guy Barrett

By: Dean Momohara

Summary

The samples were analyzed and/or digested using the following methods: EPA method 200.7 for the digestion and analysis of minerals and EPA method 200.8 (ICPMS) for the digestion and analysis of trace metals.

All analyses requested were evaluated by established regulatory quality assurance guidelines.

Sample Information

Samples were received by Manchester Environmental Laboratory on 09/29/06. All coolers were received within the proper temperature range of 0°C - 6°C. The samples were received in good condition and were properly preserved. Forty (40) samples were received and assigned laboratory identification numbers 394180 – 394219

Holding Times

All analyses were performed within established EPA holding times.

Calibration

Instrument calibrations and calibration checks were performed in accordance with the appropriate method. All initial and continuing calibration checks were within control limits. ICPMS calibration correlation coefficients were within the acceptance range of 1.000 - 0.995. The instruments were calibrated with NIST traceable standards and verified to be in calibration with a second source NIST traceable standard.

Method Blanks

No analytically significant levels of analyte were detected in the method blanks associated with these samples.

Matrix Spikes

The matrix spike (MS) recoveries for total calcium associated with sample 394199 were not calculated. The standard spiking level was insufficient for the elevated concentration of analyte in the source sample and no action was taken. All other MS recoveries were within the acceptance limits of 75% - 125%.

Replicates

All duplicate relative percent differences of samples with concentrations greater than 5 times the reporting limit were within the acceptance range of 0% - 20%.

Laboratory Control Samples

All laboratory control sample recoveries were within the acceptance limits of 85% - 115%.

Other Quality Assurance Measures and Issues

All internal standard recoveries were within acceptance limits.

Several samples were diluted prior to analysis due to matrix interference. The reporting limits were raised accordingly.

Samples 394184 and 394191 for dissolved cobalt analysis were greater than their associated total results. The reanalysis of the samples directly from the container confirmed the initial results.

Sample 394218 for dissolved selenium analysis was greater than the associated total result. The total selenium result was qualified as an estimate.

The results for total aluminum and one dissolved aluminum (sample 394218) were qualified as estimates. The samples contained matrix interference that caused the background to be elevated in each sample.

U - The analyte was not detected at or above the reported result.

UJ - The analyte was not detected at or above the reported estimated result.

J - The analyte was positively identified. The associated numerical result is an estimate.

NC - Not Calculated

bold - The analyte was present in the sample. (Visual Aid to locate detected compounds on report sheet.)

Please call Dean Momohara at (360) 871-8808 to further discuss this project.

cc: Project File

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium

Project Name: Frontier Hardchrome - 39 **LIMS Project ID:** 1745-06

Project Officer: Guy Barrett **Method:** EPA200.8

Date Reported: 10/09/06 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
06394180		W99R5A	Water	0.55		ug/L	09/25/06	10/04/06
06394180	LMX1 (matrix spike)			95		%	09/25/06	10/04/06
06394180	LMX2 (matrix spike)			97		%	09/25/06	10/04/06
06394181		W99R5B	Water	2.5		ug/L	09/25/06	10/04/06
06394182		W856A	Water	4.1		ug/L	09/25/06	10/04/06
06394183		W856B	Water	3.8		ug/L	09/25/06	10/04/06
06394185		W9821A	Water	2.5		ug/L	09/25/06	10/04/06
06394186		W9821B	Water	2.2		ug/L	09/25/06	10/04/06
06394187		RAMW16B	Water	45.0		ug/L	09/25/06	10/04/06
06394189		RAMW16A	Water	1.7		ug/L	09/25/06	10/04/06
06394190		RAMW15B	Water	33.0		ug/L	09/25/06	10/04/06
06394192		RAMW15A	Water	2.7		ug/L	09/25/06	10/04/06
06394193		RAMW17A	Water	4.0		ug/L	09/26/06	10/04/06
06394194		RAMW13A	Water	0.63		ug/L	09/26/06	10/04/06
06394195		RAMW13B	Water	0.50	U	ug/L	09/26/06	10/04/06
06394196		RAMW13C	Water	5.50		ug/L	09/26/06	10/04/06
06394197		B85-3	Water	0.90		ug/L	09/26/06	10/04/06
06394198		RAMW14A	Water	1.4		ug/L	09/26/06	10/04/06
06394199		RAMW14B	Water	0.64		ug/L	09/26/06	10/04/06
06394200		W92-16A	Water	2.1		ug/L	09/26/06	10/04/06
06394201		W92-16B	Water	1.6		ug/L	09/26/06	10/04/06
06394202		W85-7A	Water	1.6		ug/L	09/26/06	10/04/06
MB06275I1		Lab BLNK	Water	0.50	U	ug/L		10/04/06
ML06275I1		Lab LCS-	Water	103		%		10/04/06

Authorized By: M. Jones Release Date: 10/9/06

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium

Project Name: Frontier Hardchrome - 39 **LIMS Project ID:** 1745-06

Project Officer: Guy Barrett **Method:** EPA200.8

Date Reported: 10/11/06 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
06394203		W85-7B	Water	0.50	U	ug/L	09/26/06	10/10/06
06394204		B87-8	Water	**45.6**		ug/L	09/27/06	10/10/06
06394204	LMX1 (matrix spike)			**108**		%	09/27/06	10/10/06
06394204	LMX2 (matrix spike)			**106**		%	09/27/06	10/10/06
06394205		-----	Water	**14.3**		ug/L	09/27/06	10/10/06
06394207		B85-4	Water	**1.5**		ug/L	09/27/06	10/10/06
06394208		W97-18B	Water	**1.3**		ug/L	09/27/06	10/10/06
06394209		W97-18A	Water	**0.53**		ug/L	09/27/06	10/10/06
06394210		W98-20A	Water	**1.0**		ug/L	09/27/06	10/10/06
06394211		W97-19A	Water	**2.1**		ug/L	09/27/06	10/10/06
06394212		W97-19B	Water	**2.1**		ug/L	09/27/06	10/10/06
06394213		RAMW11A	Water	**4.1**		ug/L	09/27/06	10/10/06
06394214		RAMW11B	Water	**1.9**		ug/L	09/27/06	10/10/06
06394215		RAMW12C	Water	**1.5**		ug/L	09/28/06	10/10/06
06394216		RAMW12B	Water	**2.4**		ug/L	09/28/06	10/10/06
06394217		RAMW12A	Water	**5260**		ug/L	09/28/06	10/10/06
06394219		----	Water	**8980**		ug/L	09/28/06	10/10/06
MB06282I1		Lab BLNK	Water	0.50	U	ug/L		10/10/06
ML06282I1		Lab LCS-	Water	**101**		%		10/10/06

Authorized By: M Jones Release Date: 10/11/06 Page: 1

Washington State Department of Ecology
Manchester Environmental Laboratory
Analysis Report for
Chromium

Project Name: Frontier Hardchrome - 39 **LIMS Project ID:** 1745-06

Project Officer: Guy Barrett **Method:** EPA200.8

Date Reported: 10/04/06 **Analyte:** Chromium

Sample	QC	Field ID	Matrix	Result	Qualifier	Units	Collected	Analyzed
06394184		W856B	Field Filtered water	3.27		ug/L	09/25/06	10/03/06
06394188		RAMW16B	Field Filtered water	1.3		ug/L	09/25/06	10/03/06
06394191		RAMW15B	Field Filtered water	2.75		ug/L	09/25/06	10/03/06
06394206		B87-8	Field Filtered water	13.4		ug/L	09/27/06	10/03/06
06394206	LMX1	(matrix spike)		95		%	09/27/06	10/03/06
06394206	LMX2	(matrix spike)		98		%	09/27/06	10/03/06
06394218		RAMW12A	Field Filtered water	6.0		ug/L	09/28/06	10/03/06
MB062761I		Lab BLNK	Water	0.25	U	ug/L		10/03/06
ML062761I		Lab LCS-	Water	94		%		10/03/06

Authorized By: M. Jones Release Date: 10/4/06

APPENDIX C

DATA VALIDATION MEMORANDUM

EXCEPTION SUMMARY FOR LABORATORY DATA QUALITY ASSURANCE REVIEW

DATA SUMMARY

The laboratory data quality assurance review and validation of analytical results for 40 water samples, Project Number 1745-06, collected between 25 September 2006 and 28 September 2006 from the Frontier Hard Chrome site has been completed. This review incorporates sample results for other metals for assessment purposes, but applies only to the following analyses:

- Total recoverable and dissolved chromium by Washington State Department of Ecology's (WDOE) Manchester Environmental Laboratory (MEL), of Port Orchard, Washington, following EPA Method 200.8 – inductively-coupled plasma/mass spectrometry (IC/MS).

Quality assurance/quality control (QA/QC) reviews of laboratory procedures were performed on an ongoing basis by the laboratory. A data review was performed by the laboratory QA section on laboratory quality control results to ensure they met method quality objectives for the project. Data review followed the format outlined in the *National Functional Guidelines for Inorganic Data Review* (EPA 2004), modified to include specific criteria specified in the *Frontier Hard Chrome Long-Term Monitoring Plan* (Work Plan; Weston 2004). Raw laboratory data including calibrations, sample login forms, sample preparation logs and bench sheets, mass spectral tuning data, and raw instrument data were not available for this review.

This is an exception summary. All laboratory quality assurance results as applicable (e.g., holding times; blank sample analysis, matrix spike/duplicate spike analysis, and laboratory control sample analysis results) supplied to Weston for the analyses met acceptance criteria specified in the Work Plan (Weston 2004), with the following exception:

- The relative percent difference (RPD) between analysis of field duplicate samples collected from monitoring well RAMW12A was determined to be 52.2 percent. Field notes indicate significant amounts of a black particulate material was present in the samples. Total recoverable chromium results for samples RAMW12A and its associated field duplicate sample were qualified as estimated concentrations (J). No other data were qualified for this event.

DATA QUALIFICATION

No other QA/QC exceptions were noted in the data review. Upon consideration of the data qualifications noted above and the project data quality objectives specified in the QAPP, the data are ACCEPTABLE for use except where flagged with data qualifiers that modify the usefulness of the individual values.

DATA QUALIFIERS

Any data qualifiers applied by the laboratory have been removed from the data summary sheets and superseded by data validation qualifiers as follow:

The following qualifiers were used to modify the data quality and usefulness of individual analytical results.

U - The analyte was not detected at the given quantitation limit.

J - The analyte was positively identified and detected; however, the concentration is an estimated value because the result is less than the quantitation limit or quality control criteria were not met.

DATA ASSESSMENT

Data review was performed by an experienced quality assurance chemist independent of the analytical laboratory and not directly involved in the project.

This is to certify that I have examined the analytical data and based on the information provided to me by the laboratory, in my professional judgment the data are acceptable for use except where qualified with qualifiers that modify the usefulness of those individual values.

Original signed 14 November 2006
R. Paul Swift, Ph.D. Date
Chief Chemist